NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		107FM13		
DUCTS AND VENT MANIFOLD, ITEM 107 ---------- 0107-81057-35/36 (1) (HELASTIC) ---------- 0107-82568-09 (1SET) ---------- 0107-81057-37/38 (1) (RUCOTHANE) ---------- 0107-811466-02 (1SET)	2/1R	Restricted flow, plenum return duct. Contamination, foreign matter or debris in vent tube. Collapse of vent plenum return duct.	END ITEM: Partial blockage of vent return duct. GFE INTERFACE: Reduction of ventilation flow. MISSION: Terminate EVA. Loss of use of EMU. CREW/VEHICLE: None with single failure. Loss of crewman if Item 121 vent flow sensor and SOP fails. TIME TO EFFECT /ACTIONS: Seconds. Activate purge valve and return to airlock. TIME AVAILABLE: Minutes. TIME REQUIRED: Seconds. REDUNDANCY SCREENS: A-PASS B-PASS C-PASS	A. Design - The vent system consists of multiple vent intakes extending from a common plemum to the upper arms and ankles. Upper arm or mini vent intakes are covered with a 15 x 17 mesh polyester fabric. Leg vent intakes are covered with a 60 x 56 count nomex fabric. Both of these fabrics serve as screens/filters in the vent system. The arm and leg vent ducts merge at the plenum where a single duct, the torso duct, completes the gas flow circuit out of the LCVG into the HUT. The torso duct consists of a stainless steel coil spring having 1/8" spacing between coils, the spring is encased in a polyurethane dip solution. This assembly is then covered with a Dacron tube. The dip solution and dacron cover protect the duct from contamination. Particles reaching the vent intakes may become entrapped on the screens. Because the system consists of multiple vent openings, significant accumulation of particles larger than .066 diameter are required to block any vent intake sufficiently to restrict system vent flow. Hair, Trilock shreds and flock will be trapped by the screens but, significant accumulations are required to impede flow. Helastic: Collapse of vent tube is prevented by the use of .035" diameter stainless steel wire on either 1/8" or 3/8" spacing. A polyurethane bladder film is installed inside the wire and pressurized. The wire and bladder film are then dipped in a polyester polyurethane (Helastic) dip solution adhering the bladder film and wire. The vent tube is further restrained by a heat shrinkable dacron tube bonded in place. The elasticity of the vent tube bladder and its attachment to both the wire and dacron sleeve prevent collapse of the vent tube. Rucothane: Collapse of vent tube is prevented by the use of .035" diameter stainless steel wire on either 1/8" or 3/8" spacing. A High Density Polyethylene bladder film is installed inside the wire and pressurized. The wire and bladder film are then dipped in a polyether polyurethane (Rucothane) dip solution which upon cure becomes the outside duct bladder. The vent tube is further restrained by a heat shrinkable dacron tube bonded in place. The High Density Polyethylene bladder is then removed from the inside of the vent duct. B. Test - Acceptance: Component - See Inspection. PDA: The following tests are conducted at the LCVG Assembly level in accordance with ILC Document 0111-70028J: Vent lines pressure drop test using 70 degree F breathing air at 6.0 SCF/M at 14.7 psia with pressure drop not to exceed .93 inches of water. Vent lines flow split test verification at a pressure differential of 1.0 inch of water for the following conditions: With right arm and right leg terminators sealed.

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		107FM13		With left arm and left leg terminators sealed. With right arm and left arm terminators sealed. With right leg and left leg terminators sealed. Certification: Helastic: Bench testing to S/AD requirements for 458 hours pressurized time was performed at ILC Dover. The vent tube assembly on the certification LCVG has been in use for approximately 1199 hours without failure. Ref. Cert Test Report for the SSA, ILC Document 0111-70027. Rucothane: The Rucothane Vent Plenum Assembly (vent plenum, plenum extension, plenum cover and torso duct), Helastic arm ducts, and Helastic leg ducts were cycled to 3250 Waist Flex/Extension cycles, 5000 Waist Rotation cycles, and donned/doffed 200 times. These LCVG vent ducts passed the 0.93 inch water pressure drop requirement at 6 scfm air, the right/left arm duct and leg duct vent flow ratio, and the 2 arm duct and 2 leg duct ratio. Ref. ILC Cert Test Report 0111-711669. C. Inspection - Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provides traceability information. The following MIP's are performed during the LCVG assembly manufacturing process to assure that the failure causes are precluded from the fabricated item: Verify that screen fibers have not been cut. Verify cut edges of trilok have been edgelocked with no loose or overhanging fibers present. Trilok channels have not been blocked with adhesive. Verify that abrasion cover is securely attached to vent duct in all cemented areas with no free edges unbonded. During PDA, the following inspection points are performed at the LCVG Assembly level in accordance with ILC Document 0111-70028J: Inspection for VC level cleanliness. Verification of pressure drop not to exceed .93 inches of water during vent lines pressure drop test. Verification of the flow split in the vent lines. D. Failure History - None. E. Ground Turnaround - Tested per FEMU-R-001, LCVG Pre-Flight Test Requirements, Vent System Delta P Test. F. Operational Use - Operation Use Crew Response - Pre/post-EVA : Troubleshoot problem, if no success, use spare LCVG if

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EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-107 LIQUID COOLING & VENTILATION GARMENT (LCVG)

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: _____
HS - Project Engineering

_____
HS - Reliability

_____
HS - Engineering Manager

Approved by: _____
NASA – SSA/SSM

_____
NASA – EMU/SSM

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NASA – S&MA

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NASA – MOD

_____
NASA – Crew

_____ 7/4/02
NASA – Program Manager