

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE

		102FM09		
HARD TORSO SHELL, ITEM 102 ----- SV772375-24 PIVOTED HTS (1) OR ----- SV810003 PLANAR HTS (1)	2/1R	Restricted gas flow, return duct. Contamination or foreign material entrained in return vent ducts.	END ITEM: Partially blocked vent flow return duct. GFE INTERFACE: Reduced flow rate. MISSION: Terminate EVA. Loss of use of one EMU. CREW/VEHICLE: None for first failure. Loss of crewman if SOP or Item 121 vent flow sensor fails. TIME TO EFFECT /ACTIONS: Minutes. Actuate purge valve and return to airlock. TIME AVAILABLE: Minutes. TIME REQUIRED: Seconds. REDUNDANCY SCREENS: A-PASS B-PASS C-PASS	A. Design - Vent system design flow measured across PLSS inlet and outlet ports may not exceed 0.43 inches of water at 8.9 pph of O2 at 4.3 psia. Pressure drop through DCM purge duct may not exceed 2.8 inches of water at 6.3 pph of O2 at 3.45 psia for the Pivoted HUTs or 2.7 inches of water at 5.0 pph of O2 at 3.45 psia for the Planar HUTs. The above measurements indicate that some blockage could occur without exceeding pressure drop limits. The duct cross-section is approx. 1 x 3/8 inch and is unlikely to be completely blocked by normal debris generated during one flight. Screens located at the end of the arm/and leg ducts will keep some foreign material from entering the vent system. B. Test - Acceptance: Vendor certification and lot acceptance testing is required for all materials prior to manufacture of each item. PDA: Pressure drop test is conducted at the HUT Assembly level in accordance with ILC Document 0111-70028J (Pivoted HUT) or 0111-710112 (Planar HUT). Certification: Pivoted HUT: Manned testing to S/AD requirements, 461 hours pressurized time and 432 pressure cycles was performed at ILC. Ref. Cert Test Report for the SSA, ILC Document 0111-70027. The HUT has accumulated 612 pressurized hours and 436 pressurized cycles during certification testing. Planar HUT: Manned testing for 458 hours pressurized at 4.3 psid was performed at ILC. Ref. Cert Test report for the Planar HUT, ILC document 0102-711982. The Planar HUT has accumulated 916 pressurized hours and 602 pressurized cycles during certification testing. Post test inspection revealed no damage resulting from the pressure testing. C. Inspection - A visual inspection of the internal surfaces of the ducts is performed using a fiber optic scope during assembly of the HTS. Each vent duct is inspected prior to assembly to verify proper flow passage dimensions. During PDA in accordance with ILC Document 0111-70028J (Pivoted HUT) or 0111- 710112 (Planar HUT), the following MIP's are performed: Verify pressure drop is within specification. Verify quality of workmanship and cleanliness. Verify no structural damage after proof pressure test. D. Failure History - Planar HUT: I-EMU-102-A005 (11/19/96).

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		102FM09		<p>During PDA testing, Planar HUT S/N 2002 failed purge line pressure drop requirement, with 14.9" water vs. spec of 14.0". Found excess epoxy at junction of 2 duct sections. Manufacturing procedures changed to prevent excess epoxy during duct section joining. Also found Planar HUT purge line pressure drop mass flow rate specifications in error. ECO 971-0068 updates S/AD purge line design and test requirements.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Fan/Pump/Separator/Vent Flow Sensor Performance. None for EET processing. Every 56 hours of manned pressurized time the Pivoted HUT is demated from the DCM and PLSS and subjected to HUT level gas and structural and leakage tests and gas Delta "P" tests. Every 229 hours of manned prerssurized time the Planar HUT is demated from the DCM and PLSS and subjected to HUT level gas and structural and leakage tests and gas Delta "P" tests.</p> <p>F. Operational Use - Operational Use: Crew Response - Pre EVA: Trouble-shoot problem, if no success, consider EMU 3 if available, EMU no go for EVA. EVA: Upon receipt of CWS message NO VENT FLOW, terminate EVA. Open helmet purge vlv to anti-fog helmet and clear CO2 if required.</p> <p>Training - Standard EMU training covers this failure mode.</p> <p>Operational Considerations - Flight rules define go/no go criteria related to EMU ventilation flow. Flight rules require termination of EVA upon activation of SOP. EVA checklist and FDF procedures verify hardware integrity and system operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-102 HARD UPPER TORSO (HUT)
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

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