

CII
EMI CRITICAL ITEMS LIST

12/26/91 SUPERSEDES 08/30/90

ANALYST:

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NAME P/N QTY	CRII	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
PRESSURE TRANSDUCER, 1/1 ITEM 215 ----- 6U778473-6 (1)		215FMD4: Rupture of pressure sensitive interface. CAUSE: Failure of material.	END ITEM: Rapid release of high pressure oxygen (up to 6500 psi) and resulting shock wave to electrical feed through connector. Possible ignition of any particles. Loss of signal. GFE INTERFACE: Possible ignition of any particles in chamber between pressure sensitive interface and electrical feedthrough connector. MISSION: Terminate EMI. Loss of use of one EMI. CREW/VEHICLE: Possible loss of crewman if core ruptures and ignition occurs.	A. Design - The sensor body is designed to contain the pressure medium in the event of failure of the sensing diaphragm (if ignition does not occur, the sensor transduction element (diaphragm) 17-4 µm has a design safety factor of 4.25 at maximum operating pressure versus material yield strength. The calculated fatigue life of the diaphragm is three million cycles. A fracture mechanics analysis predicts that the diaphragm will leak before burst. A defect 99.2% or more through the diaphragm wall is required to cause a leak during the 45 year life of the item. B. Test - Component Acceptance Test - The pressure sensitive interface is fluorescent dye penetrant tested per Boeing 228-A-2190 of Kulite Semiconductor products for surface anomalies prior to assembly. The transducer is proof pressure tested by applying 11,100 psi and holding for three minutes. This test is done per section 10.6 of Kulite Semiconductor Products, Inc., Acceptance Test Procedure ATP 2541. The item is pressurized with a known pressure over the range of 0 - 7400 psig and 7400 - 0 psig. The output of the transducer when compared to the known pressure must be within 25% psig, except at 0 psig it shall be within 185 psig. A rupture in the pressure sensitive interface would be detected if the item failed calibration. PDA Testing - The integrity of the item is verified by proof and leakage tests, plus a transducer check test. The item is proof pressure tested at 11,100 - 11,300 psig for 5 minutes minimum, and then visually inspected for evidence of distortion, cracks, or other defects. Sequentially, the item is externally leak tested with a 28 GHe and 96A GHe mixture at a pressure of 5000 - 6200 psig in chamber vacuum. Leakage must not exceed 3.55 ± 10 ⁻⁵ cc/sec He, 5.55 ± 10 ⁻⁵ cc/sec GHe represents total end item (SOP) leakage. The item is checked for proper operation by pressurizing the end item (SOP) to a known pressure of 7200 - 7400 psig. The SOP is then allowed to bleed down at the rate of 5.26 - 5.46 lbs/hr GHe. The item pressure is compared to the known pressure at

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NAME P/N QTY	ENIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	1/1	215FRN4:		<p>the start of bleeddown and at 1 minute intervals, the output of the transducer when compared to the known pressure must be within 259 psig, except at 0 psig it shall be within 185 psig.</p> <p>Upon completion of PDA testing the item is visually final inspected for damage to external surfaces, mounting points and general appearance.</p> <p>Certification Test - A test specimen survived 4000 operating pressure cycles and 112 proof pressure cycles up a life requirement of 4000 and 48 respectively during 06/00.</p> <p>C. Inspection - Material Defect - The pressure interface thickness and surface finish requirements are 100% inspected at the vendor. Details are manufactured from material with certified physical and chemical properties. All pressure sensitive interfaces are liquid penetrant inspected to verify that surfaces are free from defects.</p> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - Tested for rupture per FEMU-N-001, SDP Transducer Calibration.</p> <p>F. Operational Use - Crew Response - PreEVA, PostEVA, and EVA: No response possible. Training - No EMU training specifically covers this mode.</p>