

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
O2 PRESSURE REGULATOR 1ST STAGE, ITEM 2130 ----- 8V799042-3 (1)	2/100	2130FM03A: Internal leakage, fails open. CAUSE: Contamination, lip seal deterioration, ball actuator or return plunger jams.	END ITEM: Increase in the interstage regulated pressure level above 250 psid. GFE INTERFACE: None for single failure. Suit pressure remains within spec since second stage operates normally. A subsequent failure of the regulator 2nd stage (item 2130) would allow a flow rate greater than 7.5 lb/hr, overpressurizing the suit. MISSION: None for single failure, for a double failure possible suit overpressur- ization. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of item 2130.	A. Design - Two of the three possible high pressure oxygen leak paths . . are sealed with molded silicone rubber lip seals. As pressure is applied to these parts, load on the lip increases. Leakage through the spring loaded synthetic sapphire ball/vespet SP-1 seal assembly is minimized, since high pressure acts to increase the load on the seal interface. The regulator is cleaned to HS3150 level EM 50A to preclude any residual contamination. The first stage regulator is protected by a 25 micron absolute nickel filter to minimize the chance of jamming. The nominal rating of the filter is 18 micron, which is equivalent to a particle size of 0.0007 inches. Diametrical clearance between sliding parts is small to minimize cocking. It is 0.001-0.0015 inch between the valve stem and housing and 0.0005-0.0025 inch between the spring seat and housing. The housing is made of stress relieved Monel 400 and the valve stem and spring seat are made of age hardened Monel K 500 to minimize the chance of galling. All sliding surfaces are either 16 or 32 microinch finish. To minimize the potential for cocking, the L/D ratio for the 8V799042-2 valve stem-housing combination is 8, and for the spring seat-housing combination is 4.6. All edges are either radiused or chamfered. B. Test - Component Acceptance Test - The vendor, CIL, performs the following tests to assure the first stage regulator does not fail open or internally leak: Contamination or jamming of the demand valve is reduced/minimized by cleaning all of the regulator internal details and oxygen passageways to HS3150 EM50A. The test facility hardware and gases also meet this requirement. The regulator internal leakage is tested during acceptance testing at 7400 psi inlet pressure. POA Test - Contamination or jamming of the demand valve is reduced/minimized by cleaning all interfacing inlet test fixtures and hoses to HS3150 EM50A. Test gases are also required to meet this requirement, the item is tested prior to and immediately after POA performance testing to verify that there is no internal leakage. With the regulator inlet pressurized to 5000-6200

CII
EMF CRITICAL ITEMS LIST

Page: 2
Date: 12/02/91

12/24/91 SUPERSEDES 08/31/90

AMALPBT:

NAME P/N QTY	CAIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1RD	2130FMD3A:		<p>psig, and the interstage pressurized to 290-310 psig, the first stage leakage must not exceed 18 acc/min O2.</p> <p>During regulator performance testing, the regulator inlet is pressurized to 7400 psig and then 350 psig at sea level ambient. The outlet flow must not exceed 8.2 lbs/hr. After regulator endurance testing, this test is repeated at both sea level ambient and vacuum ambient conditions.</p> <p>Certification Test - During 1/89 the 54799042 SOP completed 5000 on/off cycles and 100 proof cycles which is four times the 15 year expected use cycles. During the flow testing phase, the SOP completed 325 total hours of regulation at 5 ppm or 0.16. The SOP assembly also completed the 15 year random vibration, sinusoidal vibration, design shock and bench shock testing.</p> <p>C. Inspection - All details, gages and test facilities are cleaned and inspected to AS3150 EN50A to preclude contamination clogging. Details, including the lip seal, are 100% inspected per drawing dimensions and surface finish characteristics. The runout and final torque of all threaded connections are verified by Vendor and UCAS inspectors. A trial assembly is made on all details and then they are visually inspected. The demand valve pintle is manually depressed during assembly to assure free motion.</p> <p>D. Failure History - MEMO-240-A004 (7/3/80) High interstage pressure due to leaking demand valve lip-seal. Dimensional controls were revised to preclude seal misalignment as per EC62803-72. MEMO-213-A003 (1/23/81) Internal leakage due to high pressure pump oil contamination. Rigs changed to preclude high pressure pump oil contamination.</p> <p>E. Ground Turnaround - Tested for failed open regulator per FEMU-4-001. Regulator performance and flow limiting check.</p>

SEMI-4-001H
Page 1248

CIL
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES 08/31/90

ANALYST:

Page: 3
Date: 12/02/81

NAME P/H QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1RB	2136FND3A1		<p>f. Operational Use - Crew Response - EVA: Since this failure is not detectable and EVA termination is required as soon as SOP is flowing, crew would continue to terminate EVA. 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 EMU as least for loss of operational SOP.</p>