

CEL
 CRITICAL ITEMS LIST
 FILE: CEL3/1

NAME P/N QTY	CRIF	FAILURE MODE & CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
02 PRESSURE REGULATOR, 2ND STAGE ITEM 2130 SV778475- 13 (1) FC183-1	2/1R	2130/040; FAILS CLOSED. CAUSE: CONTAMINATION, BALL RETURN PLUNGER OR ACTUATOR PLUNGER, OR BALANCE STEM JMS) BELLONS ASSEMBLY LEAKAGE, SPRING RELAXES OR FRACTURES.	END ITEM: UNABLE TO PLACE SO2 ON-LINE. GFE INTERFACE: UNABLE TO SUPPLY EMERGENCY OXYGEN WHEN REQUIRED. MISSION: NONE, UNLESS THERE IS ANOTHER FAILURE WHICH REQUIRES SO2 OPERATION. CREW VEHICLE: NONE FOR SINGLE FAILURE, POSSIBLE LOSS OF CRO2WH WITH LOSS OF PLSS.	A. DESIGN - IF THE 17-4PH ON/OFF ACTUATOR PLUNGER STICKS, THE OXYGEN ACTUATOR ON THE OCM CANNOT BE MOVED TO THE BY POSITION. THIS SHOULD BE DETECTED BEFORE THE START OF THE MISSION. THE SECOND STAGE 17-4PH SPRINGS OPERATE AT A STRESS BELOW YIELD POINT. THE HELICAL REGULATING SPRING HAS A CYCLE LIFE OF 280,000 CYCLES. THE ON/OFF ACTUATOR SPRING HAS A CYCLE LIFE OF 20,000,000 CYCLES. A CYCLE IS DEFINED AS STRESSING THE SPRING FROM ZERO TO OPERATING LOAD STRESS AND BACK. THE SPECIFICATION REQUIREMENT IS 1825 PRESSURIZATION CYCLES. THE SYSTEM IS CLEANED TO WS3180 LEVEL EN504 BEFORE OPERATION WHICH MINIMIZES THE AMOUNT OF CONTAMINATION INITIALLY IN THE SYSTEM. PARTICLE DEGRADATION DURING OPERATION IS MINIMIZED BY MATERIAL SELECTION AND SURFACE FINISHES. THE SECOND STAGE REGULATOR IS PROTECTED BY A 25 MICRON ABSOLUTE MICRON FILTER TO MINIMIZE THE CHANCE OF JAMMING. THE NOMINAL RATING OF THE FILTER IS 10 MICRON WHICH IS EQUIVALENT TO A PARTICLE SIZE OF 0.0007 INCHES. DIAMETRICAL CLEARANCE BETWEEN SLIDING PARTS IS SHALL TO MINIMIZE COCKING. IT IS 0.0018-0.0025 BETWEEN THE HONEL BEHIND VALVE PINNLE AND HOUSING, 0.0005-0.0025 BETWEEN THE RETURN HONEL KEOR PLUNGER AND HONEL HOUSING AND 0.0005-0.0015 BETWEEN THE HONEL 400 STEM GUIDE AND HONEL K580 PRESSURE BALANCE STEM. THE FILTER REDUCES THE PROBABILITY OF A PARTICLE JAMMING THESE DETAILS.

CIL
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02 PRESSURE REGULATOR, 2ND STAGE ITEM 2130 SVF70475- 13 (3) FCLOS-2 "	2/1R	2810FN01B: FAILS CLOSED.		<p>A. DESIGN - (CONTINUED) THE POLISHING AND STEM GUIDE ARE MADE OF STRESS RELIEVED MONEL 400 AND THE VALVE STEM, SPRING SEAT, AND PRESSURE BALANCE STEM ARE MADE OF AGE HARDENED MONEL K500 TO MINIMIZE THE CHANCE OF GALLING. ALL SLIDING SURFACES HAVE EITHER A 16 OR 32 MICRINCH FINISH. ALL EDGES ARE EITHER RADIUSSED OR CHAMFERED. THE L/D RATIO FOR THE VALVE STEM - POLISHING COMBINATION IS 7; FOR THE SPRING SEAT - POLISHING COMBINATION IS 1.6; AND FOR THE PRESSURE BALANCE STEM - STEM GUIDE IS 7. THE BELLOWS IS DESIGNED FOR 86 PSID. THE BELLOWS IS PROOF TESTED TO 26 PSID. THE OPERATING PRESSURE IS 5.9 PSID.</p> <p>B. TEST - COMPONENT ACCEPTANCE TEST - THE VENDOR, CTS, PERFORMS THE FOLLOWING TESTS TO ASSURE THE SECOND STAGE REGULATOR DOES NOT FAIL CLOSED. CONTAMINATION IS REDUCED/MINIMIZED BY CLEANING ALL OF THE REGULATOR INTERNAL DETAILS AND OXYGEN PASSAGEWAYS TO HS3150 QMSQA. THE TEST FACILITY HARDWARE AND GASES ALSO MEET THIS REQUIREMENT. THE REGULATION BAND IS VERIFIED DURING ACCEPTANCE TEST BY PERFORMANCE TESTS AT SEA LEVEL WITH AN INLET PRESSURE OF 7400 PSI AND A VARYING FLOW RATE FROM 0.06 TO 5.3 TO 0.06 PPH. THE PERFORMANCE TEST IS ALSO PERFORMED AT VACUUM CONDITIONS WITH INLET PRESSURES OF 7400, 5056, 2710 MM Hg AND A VARYING FLOW RATE FROM 0.06 TO 5.3 TO 0.06 PPH.</p> <p>FOA TEST - CONTAMINATION OR CLOSING OF THE INLET FILTER IS REDUCED/MINIMIZED BY CLEANING ALL INTERFACING INLET TEST FIXTURES AND NOSES TO HS3150 QMSQA. TEST GASES ALSO MEET THIS REQUIREMENT.</p>

CFL
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O2 PRESSURE REGULATOR, 2ND STAGE ITEM 2130 SV770475- 13 (1) FC805-3 "	2/1R	2850FN001; FAILS CLOSED.		<p>PBA TEST - (CONTINUED) REGULATOR PERFORMANCE IS VERIFIED IN A SERIES OF PERFORMANCE AND ENDURANCE TESTS. THE REGULATOR IS PERFORMANCE TESTED INITIALLY AT SEA LEVEL AMBIENT AT 7400 PSIG AND 350 PSIG INLET PRESSURES. AT EACH INLET PRESSURE, THE OUTLET PRESSURE IS MONITORED OVER THE FLOW RANGES OF 0-0.2 LBS/HR O2 (MAX) AND 0.2 (MAX) -0 LBS/HR O2. INITIALLY THE END ITEM (SOP) IS ALLOWED TO BLOWDOWN FROM 7400 PSIG TO 350 PSIG MAX, WHILE VERIFYING PROPER REGULATOR FUNCTION. WITH THE INLET AT 7400 PSIG, THE ITEM IS ENDURANCE FLOWED AT 4.5-5.25 LBS/HR O2 FOR 5 HOURS MINIMUM AND AT 0.5-2.0 LBS/HR O2 FOR 2.5 HOURS MINIMUM. AGAIN, THE END ITEM (SOP) IS ALLOWED TO BLOWDOWN FROM 7400 TO 350 PSIG. WITH THE INLET PRESSURE AT 350 PSIG, THE ITEM IS ENDURANCE FLOWED AT 4.5-5.25 LBS/HR O2 FOR 5 HOURS MINIMUM, AND 0.5-2.0 LBS/HR O2 FOR 2.5 HOURS MINIMUM. AFTER THE BLOWDOWN AND ENDURANCE TESTING, THE ITEM IS PERFORMANCE TESTED AT SEA LEVEL AND VACUUM AMBIENT WITH INLET PRESSURES OF 7400 PSIG AND 350 PSIG. FOR EACH CONFIGURATION THE OUTLET PRESSURE IS MONITORED OVER THE FLOW RANGES OF 0-0.2 LBS/HR O2 (MAX) AND 0.2 (MAX) -0 LBS/HR O2.</p> <p>AN ADDITIONAL BLOWDOWN IS PERFORMED PRIOR TO VACUUM AMBIENT TESTING.</p> <p>CERTIFICATION TEST - THE ITEM COMPLETED THE FOLLOWING CYCLE TEST DURING 5/98: ON/OFF ACTUAL 3025, SPEC 1081; NO FLOW HOURS ACTUAL 904, SPEC 10; BLOWDOWN ACTUAL 118, SPEC 35. NO CLASS I ENGINEERING CHANGES HAVE BEEN INCORPORATED SINCE THIS CONFIGURATION WAS CERTIFIED.</p>

C31
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NAME P/N QTY	CRIT	FAILURE MODE & CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
02 PRESSURE REGULATOR, 2ND STAGE ITEM 2190 SV770475- 13 111 FC189-A "	2/3R	2130FFM191 FABLS CLOSED.		<p>C. INSPECTION - DETAILS ARE 100% INSPECTED PER DRAWING DIMENSIONS AND SURFACE FINISH CHARACTERISTICS. DETAILS ARE MANUFACTURED FROM MATERIAL WITH CERTIFIED PHYSICAL AND CHEMICAL PROPERTIES. ALL DETAILS, GAGED, AND TEST FACILITIES ARE CLEANED AND INSPECTED TO HSS15H ENG99 TO PRECLUDE CONTAMINATION CLOGGING. RINNING AND FINAL TORQUE OF ALL THREADED CONNECTIONS ARE VERIFIED BY VENDOR AND DEAS INSPECTORS. A BRUAL ASSEMBLY IS RUN ON ALL DETAILS AND THEN THEY ARE VISUALLY INSPECTED. THE DEMMO VALVE PINWLE AND BALANCE STEM ARE MANUALLY DEPRESSED DURING ASSEMBLY TO ASSURE FREE MOTION.</p> <p>D. FAILURE HISTORY - NONE.</p> <p>E. GROUND TYPHOARDING - TESTED PER FEMU-R-001, SOP SERVICING FOR FLIGHT, SEA LEVEL REGULATOR PERFORMANCE.</p> <p>F. OPERATIONAL USE - CREW RESPONSE - EVA: SINCE EVA TERMINATION IS REQUIRED AS SOON AS SOP IS FLOWING, CREW WOULD ABORT EVA WHEN INSUFFICIENT SOP REGULATION IS DETECTED. SPECIAL TRAINING - STANDARD ENU 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 ENU PRESSURE INTEGRITY AND REGULATION. FLIGHT RULES DEFINE ENU AS LOST FOR LOSS OF OPERATIONAL SOP. REAL TIME DATA SYSTEM ALLOWS GROUND MONITORING OF ENU SYSTEMS.</p>