

# CRITICAL ITEMS LIST

Reference Designator:  
 Name/Quantity: Demand Breath. Regulator  
 Drawing Reference: RMC 1051

Project: Quick Don Mask Assy.  
 LRU Name/Quantity: QDMA  
 LRU Part Number: SED33104528-303

Subsystem: CEE  
 Effectivity: ALL ORBITERS

03 Dec 61

| Failure Mode Number<br>QDMA-FM-001   | Criticality<br>1R/2              | Failure Effect  | Retention Rationale  |
|--|----------------------------------|---|--|
| <b>Function</b><br><br>Supplies oxygen on demand to the oral/nasal cavity.   |                                  | <b>End Item</b><br>Free flow of regulator.<br>Excessive consumption of oxygen.  | <p><b>1. DESIGN FEATURES TO MINIMIZE FAILURE MODE</b></p> <p>A. A screen filter (20 micron) fabricated of stainless steel is incorporated into the inlet port to prevent contamination of the regulator.</p> <p>B. The diaphragm and packings are fabricated of elastic silicone rubber with a minimum age life of 6 years.</p> <p>C. Regulator designed to withstand a minimum of 250,000 cycles with a peak breathing rate of 30 l/min for 200,000 and 70 l/min for 50,000.</p> <p><b>2. TEST OR ANALYSIS TO DETECT FAILURE MODE</b></p> <p>A. Acceptance Test</p> <p>(1) Safety pressure test at 60, 70, and 110 psig inlet pressure and 70 slpm flow. Specification: 0.1 to 1.0 ml H<sub>2</sub>O.</p> <p>(2) Normal outward leakage test. Specification: Less than 0.1 l/min</p> <p>(3) Emergency outward leakage test. Specification: Less than 1.0 l/min.</p> <p>(4) Mask regulator inward leakage test with 4.0 in H<sub>2</sub>O. suction and inlet plugged. Specification: Less than 0.2 l/min.</p> <p>B. Certification</p> <p>(1) Certification in accordance with TSO-C89, Federal Aviation Administration, Technical Standard Order, Protective Breathing Equipment.</p> <p>(2) Subjected to temperatures of 160°F for 12 hours and -67°F for 2 hours after which a complete functional test is performed.</p> <p>(3) Cycle tested 250,000 cycles with a peak breathing rate of 30 l/min for 200,000 cycles and 70 l/min for 50,000 cycles. Complete functional test performed after cycling.</p> <p>(4) Proof pressure test at 105 psig for 2 minutes (110 psig max operating pressure). Complete functional test performed after proof pressure test.</p> |
| <b>Failure Mode and Cause</b><br><br>Falls Open/Leakage<br><br>Cause:<br>1. Defective diaphragm material<br>2. Contamination<br>3. Defective demand valve<br>4. Spring valve failure |                                  | <b>Mission</b><br><br>None  |  |
| <b>Redundancy Screens</b><br>A - P<br>B - N/A<br>C - P   |                                  | <b>Crew/Vehicle</b><br>Possible loss of crewmember due to inability of mask to maintain positive pressure in free flow condition. |  |
| <b>Remaining Paths</b><br>Requires previous single point Orbiter failure.  |                                  | <b>Interface</b><br>Excessive PPO <sub>2</sub> in cabin.  |  |
| <b>Mission Phase</b><br>Orbiter<br>Emergency   | <b>Time to Effect</b><br>Seconds | <b>Time to Correct</b><br>N/A   |  |

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Reference Designator:  
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Project: Quick Don Mask Assy.  
 LRU Name/Quantity: ODMA  
 LRU Part Number: SED33104526-303

Subsystem: CEE  
 Effectivity: ALL ORBITERS

| Failure Mode Number<br>ODMA-FM-001   | Criticality<br>1R/2   | Failure Effect  | Retention Rationale  |
|--|-----------------------|---|--|
| <b>Function</b><br><br>Supplies oxygen on demand to the face cavity.   |                       | <b>End Item</b><br>Free flow of regulator.<br>Excessive consumption of oxygen.  | C. Turnaround Testing (per PDA/PIA procedure)<br><br>(1) Complete PDA testing performed every 24 months or before every flight. Testing includes positive pressure, flow, inward and outward leakage tests.<br>(2) Replacement of regulator softgoods and overhaul every 6 years. Complete PDA testing after overhaul.<br><br>3. INSPECTION<br><br>A. Manufacturing<br><br>(1) Verify all materials, parts and assembly processes meet requirements.<br>(2) Visual inspection of parts for defects.<br>(3) Verify all internal parts cleaned for oxygen service per JSCM 5322, Level 100C.<br><br>B. Turnaround Inspection (per PDA/PIA procedure)<br><br>(1) Visual inspection of parts for defects.<br>(2) Visual inspection during regulator assembly/overhaul.<br>(3) Verify regulator operates within leakage specifications. (4) Verify regulator operates within positive pressure specifications.<br>(5) Replacement of regulator softgoods and overhaul every 6 years.<br>(6) Verify parts and regulator cleaned for oxygen service per JSCM 5322, Level 100C.<br>(7) Verify external cleanliness to Level GC per JSCM 5322 |
| <b>Failure Mode and Cause</b><br><br>Falls Open/Leakage<br><br>Cause:<br><br>1. Defective diaphragm material<br>2. Contamination<br>3. Defective demand valve<br>4. Spring valve failure |                       | <b>Mission</b><br><br>None  |  |
|  |                       | <b>Crew/Vehicle</b><br>Possible loss of crewmember due to inability of mask to maintain positive pressure in free flow condition. |  |
| <b>Redundancy Screens</b>   <b>Remaining Paths</b><br><br>A-P   Requires previous single point Orbiter failure.<br>B-N/A<br>C-P  |                       | <b>Interface</b><br>Excessive PPO <sub>2</sub> in cabin.  |  |
| <b>Mission Phase</b>   | <b>Time to Effect</b> | <b>Time to Correct</b>  |  |
| <b>Orbiter Emergency</b>   | <b>Seconds</b>        | <b>N/A</b>  |  |

DATE: 4/92 REVISION: BASIC

ODMA - 18

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Subsystem: CEE  
Effectivity: ALL ORBITERS

| Failure Mode Number<br>ODMA-FM-001   | Criticality<br>1R/2   | Failure Effect  | Retention Rationale  |   |
|--|---|---|--|---|
| <b>Function</b><br>Supplies oxygen on demand to the face cavity.   |   | <b>End Item</b><br>Free flow of regulator.<br>Excessive consumption of oxygen.  | <b>4. FAILURE HISTORY</b><br>This regulator is used in commercial applications (Grumman Gulfstream, Boeing 747-400) and military applications (C-130). No service failures reported. |   |
| <b>Failure Mode and Cause</b><br>Falls Open/Leakage<br>Cause:<br>1. Defective diaphragm material<br>2. Contamination<br>3. Defective demand valve<br>4. Spring valve failure |   |   |  | <b>5. OPERATIONAL USE</b><br>A. Operational effect of failure: Potential loss of crew member due to inability of mask to maintain positive pressure in free flow condition.<br>B. Crew action: No work around if this failure occurs.<br>C. Crew training: Crewmembers are trained in the correct function and use of the ODMA.<br>D. Mission constraint: None.<br>E. In flight checkout: None. |
| <b>Redundancy Screens</b><br>A-P<br>B-N/A<br>C-P   | <b>Remaining Paths</b><br>Requires previous single point Orbiter failure. |   |  |   |
| <b>Mission Phase</b><br>Orbiter<br>Emergency   | <b>Time to Effect</b><br>Seconds  | <b>Time to Correct</b><br>N/A   |  |   |
|  |   | <b>Mission</b><br>None  |  |   |
|  |   | <b>Crew/Vehicle</b><br>Possible loss of crewmember due to inability of mask to maintain positive pressure in free flow condition. |  |   |
|  |   | <b>Interface</b><br>Excessive PPO <sub>2</sub> in cabin.  |  |   |