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| Component | Failure Mode | Causes | Effects | Severity | Probability | Risk | Mitigation Measures | Post-Mitigation Risk | Detection | Verification |
| Oxygen Cylinder | Pressure leak or explosion | Corrosion, mechanical damage, overpressure | Oxygen depletion, crew hypoxia, fire risk | 1 (Catastrophic) | C (Occasional) | High | Periodic inspections, use of resistant materials, backup system | Medium | 5 (Moderate detection with test tools) | Annual pressure testing (e.g., C35001-37) |
| Pressure Regulator | Improper pressure regulation (high/low) | Mechanical failure, clogging | Insufficient or excessive oxygen, mask damage | 2 (Critical) | B (Probable) | High | Redundant design, input filters, automatic monitoring | Low | 3 (Easy detection with indicators) | Simulation testing in AMM 35-12 |
| Oxygen Masks | Failure in oxygen delivery (leak or blockage) | Physical damage, wear | Immediate crew hypoxia, loss of aircraft control | 1 (Catastrophic) | C (Occasional) | High | Quick-donning masks, pre-flight testing | Medium | 4 (Detection via checklist) | FAA inspections for B737 models |
| Pressure Transducer | Incorrect pressure reading | Electronic failure, miscalibration | Undetected leak, delayed response | 2 (Critical) | D (Remote) | Serious | Redundant sensors, automatic alerts | Low | 6 (Difficult detection without tools) | Periodic calibration with pressure gauge |
| Tubing/Lines | Leak or crack | Corrosion, vibration, weak connections | System pressure loss, contamination | 2 (Critical) | B (Probable) | High | Stainless steel usage, flareless fittings, visual inspections | Medium | 2 (Easy detection with leak tests) | Pressure testing per FAA AD |

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| Component | Reason for Being Critical | Reliable Source |
| Oxygen Cylinder | The oxygen cylinder stores high-pressure oxygen essential for crew survival during depressurization; failure (e.g., leak or rupture) can cause immediate oxygen loss, hypoxia, or explosion risk due to overpressurization in extreme conditions. | SKYbrary Aviation Safety article on aircraft oxygen systems; B737.org.uk emergency equipment page. |
| Pressure Regulator | It controls and reduces oxygen pressure for safe delivery; failures can lead to insufficient flow (causing crew incapacitation) or excessive pressure (damaging masks/system), as seen in FAA-mandated inspections for switch failures that delay warnings. | TechXplore report on US regulator orders for Boeing inspections; Business Insider on Boeing 737 switch issue. |
| Oxygen Masks | Masks provide direct oxygen to crew during emergencies; faults like displacement or blockage prevent effective delivery, potentially leading to rapid hypoxia and loss of aircraft control, prompting FAA airworthiness directives for inspections. | Reuters on FAA orders for 2,600 Boeing 737 inspections; Simple Flying on FAA checks for oxygen mask faults. |
| Pressure Transducer | This sensor monitors system pressure to detect issues early; failures result in undetected leaks or false readings, delaying crew response and risking oxygen depletion, as highlighted in FAA orders for cabin pressure sensor inspections. | NBC DFW on FAA orders for Boeing 737 cabin pressure sensors; Business Insider on switch failure leading to low oxygen. |
| Tubing/Lines | These lines distribute oxygen throughout the system; issues like leaks from corrosion or vibration cause pressure loss and contamination, compromising the entire system, as noted in FAA reports on passenger oxygen supply failures. | Reuters on FAA inspections for oxygen mask issues (including supply lines); Aviation Week on FAA order for 737 oxygen system inspections. |