

33.1 Aircraft Oxygen Systems

- Required to protect occupants from hypoxia (oxygen deficiency) at high altitudes, either
- during normal flight in unpressurized aircraft or following a depressurization in pressurized
- aircraft.
- ☐ Time of Useful Consciousness (TUC): The limited time a person has to take corrective
- action after an oxygen deprivation before losing consciousness. At 35,000 ft, this is only 30-
- 45 seconds.
- ☐ System Types:
- Gaseous Oxygen: Oxygen is stored in high-pressure green cylinders.
- Chemical Oxygen Generators: Commonly used for passenger oxygen. Pulling on the mask
- initiates a chemical reaction (Sodium Chlorate and Iron) that produces oxygen. Once started,
- it cannot be stopped and typically provides 15 minutes of oxygen.
- ☐ Mask Types:
- Diluter-Demand (Crew): Supplies oxygen only when the user inhales. It mixes cabin air
- with pure oxygen at lower altitudes and supplies 100% oxygen above ~32,000 ft.
- Continuous Flow (Passengers): Supplies a constant flow of oxygen once activated.

33.2 Fire and Smoke Detection/Protection

- ☐ Smoke Detectors: Located in cargo compartments and lavatories. They can be optical
- (photoelectric) types that detect light scattered by smoke particles, or ionization types that
- detect a change in air conductivity caused by smoke.
- ☐ Fire Detectors: Located in engine nacelles and APU compartments. Modern systems use a
- continuous fire wire or gas-filled tube that loops around the fire zones and triggers an alarm
- when it is heated to a set temperature.
- ☐ Fire Extinguishing:
- Fixed Systems: Fire bottles containing a halogenated hydrocarbon extinguishing agent (e.g.,

- Halon) are installed for the engines and APU. The pilot can discharge them from the cockpit
- after shutting down the affected engine.
- Hand-Held Extinguishers: Located in the cockpit and cabin for fighting internal fires.

33.3 Evacuation Systems

- ☐ Emergency Lighting: An independent, battery-powered lighting system that illuminates exit signs, the cabin, and escape paths for at least 10 minutes.
- ☐ Emergency Exits: Clearly marked doors and hatches. Over-wing exits and doors on large aircraft are equipped with inflatable escape slides which deploy automatically when the door is opened in the "armed" mode. Some slides can also be detached and used as life rafts.
- ☐ Personal Flotation Equipment: Life jackets are provided for flights over water. They are inflated by a CO₂ cartridge or orally.

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