

91.211

1

▷ Oxygen systems-

▷ Regulation 91.211

▷ Unpressurized

▷ Above 12,500 → Minimum flight crew is provided & uses supplemental oxygen for the part of flight of that altitude for more than 30 minutes.

▷ Above 14,000 → Minimum flight crew is provided & uses for entire flight.

▷ Above 15,000 → Minimum flight must use entire flight & passenger are provided. (not compulsory for passenger to use).

▷ FAA recommendation to have supplemental oxygen.

▷ Day → Above 10,000

▷ Night → Above 5,000

Pressurised cabin.

Above 250 $\Rightarrow$ At least 10 min supply of oxygen for each occupant, in event of a loss of cabin pressurization.

Above 350 $\Rightarrow$ One of 2 pilots must wear oxygen that is supplied all the time or automatically turns on if cabin pressure exceeds 14,000 MSL or at.

Exception if below FL410

$\Rightarrow$ If two pilots are at control & quick donning is available to wear at 5 seconds, they do not need to wear oxygen.

Exception ends ~~at~~ above FL410

$\Rightarrow$ One of 2 pilots must wear oxygen all the time.

S

3

Oxygen systems.

Basic components:-

1. Storage system

2. Delivery system

3. Mask or nasal cannula.

Storage system. (ALSM)

→ Oxygen can be stored in aircraft in form of solid, liquid or gas.

① Aviators breathing oxygen (ABO) (used for pilots).

Pros - Economical

- can be stored in low or high pressure.

Cons - Heavy

- Bulky

Liquid aviation oxygen (LOX).

Pros - 900 to 1 expansion ratio.

1 litre of LOX will expand to 900 litres of gaseous ABO.

- Less space and less weight.

Cons - Critical temperature of -197°F .

- in contact with skin means frostbite.

Sodium chlorate candles (usually used for packs)

Pros - Less weight.

- 600 to 1 expansion ratio.

Cons - Once candle is ignited hard to stop.

- High heat, hazard of fire.

Molecular sieve oxygen (usually military).

→ Takes oxygen from outside separates nitrogen (21% oxygen 78% nitrogen) and provides oxygen or store.

Oxygen delivery systems (COP)

1. Continuous Flow

- ▷ Used below 28,000 feet
- ▷ Pros - economical
- ▷ - doesn't need complex mask.
- ▷ Cons - Wasteful
- ▷ - continuous supply inhaling, exhaling.

2. Diluter demand

- Gives oxygen on demand (when inhaling and stops when exhaling)
- has control.
- ▷ Pros - helps conserve oxygen
- ▷ - dilutes with cabin air to give proper percentage of oxygen.
- ▷ Used upto 40,000ft.

Quick donn mask

- Can be used with one hand in less than 5 seconds.
- even with glasses.
- For pilots
- 40,000ft.

Dixie cup (airline passenger).

- continuous, dilution method.
- re-breather bag.
- has 2 valves in case passenger is breathing heavily, donot suffocate.

Oxygen check before flight.

PRICE check.

- P- Pressure
- R- Regulator
- I- Indicator
- C- Connection
- E- Emergency (briefing).

3. Pressure demand.

- Positive pressure and pushes oxygen direct to lungs.
- Usually used above 40,000 ft.

Oxygen masks and cannulas.

1. Nasal cannulas

- uses continuous flow
- restricted to 18,000 ft
- comfortable
- Risk when breathing with mouth or talking too much.

2. Oral nasal re-breather

- most common, cheap, simple
- has external bag & inflates when exhaling
- re-breather bag stores exhaled air & mix with 100% oxygen.
- upto 25,000 feet.