

Physiological Training

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Atmosphere

PSI

15000 ($\frac{1}{2}$) 7.35
 34,000 ($\frac{1}{4}$) 3.5
 42,000 ($\frac{1}{6}$) 2.5

H₂O Vapor

1.5% - 2%

T^o

Stand. 15°C Sea level.
 loss of 2°C for each
 1000 ft
 At 35,000 levels off
 at -55°C

Divisions of

0-35,000 ft. Troposphere {
 1. T^o change
 2. H₂O vapor
 3. Diff. prevailing winds

35-200,000 ft. Stratosphere
 1. No T. change
 2. No H₂O vapor
 3. Generally K. winds

At 35000 ft. Tropopause mixing layer
 Ht. varies w/ Lat. season, up to 60,000 ft. (24-60)
 Ht. determined by heat reflected from earth.

Respiration

Exchange of gases betw body + outside air.

Pressure Breathing	—	Normal Breathing
Rate	12-16	12-16
Inhale	No eff	Effort
Exhale	Effort	No effort

Blood pickup 95% O₂ in air
 Uses only 30%
 Exhales 65%

Hypoxia — any sympt. results from O₂ lack

T.U.C. — Time of useful consciousness

Hyperventilation 0840

Corrective measures

1. Automix 100%
 " " " " (Toggle lever engage) Dial safety (Man. Cont. req)
2. Concentrate on normal breath

3. Check O₂ equip
4. Start immed. descent (15000 or less)
5. 2 min below 15000
 Auto 100% w/ no press. (both req) 15-20 min

To recover from (below 5,000 ft.)

Hypoxia 1/2-1 min

Hypervent. 1-5 min

CO 15-20 min

Frostbite

1. Proper fitting clothing (preflight check)
2. Never be careless
3. Watch exposed places (hands, nose, ears, chin)
4. Don't touch metal w/ bare hands (worst kind)
5. Watch others for frostbite (skin blanching)

G. - forces

Can incr. G. tolerance by tensing muscles.

Positive

Negative

Transverse

Night Vision

Dark adapt.
Off-center vision.

Sensory Illusions

1. Vestibular organs

2. Autokinetic phenomena
Tricks of eye on individual

Decompression Sickness

1. Evolved (gases coming out of solution)

Bends
Chokes

Paresthesias

2. Trapped

Ears

Sinuses

Teeth

Stomach - Gas expansion

2X at	16,500
5X	34,000
7X	39,000

Denitrogenation

Bends - do not rub, massage or exercise.

Chokes - True - burning sensat. in chest, stabbing pains. (most dangerous of all sympt.)

False - breathing dry O₂ - tickling, cough

Paresthesias - itching - least dangerous.

what to do - descend below 30,000 ft.

How to prevent - Denitrogenation by breathing 100% O₂ for 1/2 hr.

may recur after getting down. In Hosp 72 hrs for obs.

O₂ Equipment + Its Use

3 systems

1. High P 1800-2100 psi
 2. Low P 400-450 psi - paired tanks & check valves
 3. Liquid - thermis jug -297°F
 - 4 L. will fill 20 low pr. tanks.
 - 4 L. supply 1 man 14 hrs.
 - Disadv. - loss from evap. - vent valve is left open
- A3 Converter - 70-100 psi

Regulators.

A-12A - Diluter Demand O₂ Reg.

100% O₂ at 24,000

Normal setting - for routine

100% " - hypoxia, fumes, injured crew memb.

Emergency Knob (red) open to get all O₂ out of tank.

A-14 Pressure breathing diluter demand Regulator.

100% O₂ at 24,000

Normal - Demand
P into mask,

Safety - 2" H₂O

41M' - 4" H₂O

43M' - 6" H₂O

45M' - 8" H₂O

45+ above 12" H₂O

- 9L - 30M'

- 30 - 40 M'

- 40 - 40 M' Forcible exhal.

- 41 - 43 M'

- 43 - 45 M'

- 45 - 50 M'

Routine use

50000 in Emerg

Diff. to tighten mask to hold pressure.

These are cabin altitude pressures.

Loss of " " - set reg. at act. alt.

100% taxiing behind another jet. + tail wind.

Masks to use

A-12A - Reg. - A-14 mask (exhal. valve only)

No way to hold P & P breath.

A-13A S/L. - 2 in port Val. 1 exhal. v.

Quick disconnect. - Has bailout bottle connection.

Do not use A-13A & A-12A Reg. - Too much P.

cant exhale, + may rupt. lungs. 42 pounds P.

New disconnect - cant do second ch. of hose

New Regulator D-1

D-2 15-17 sec delay before warn
28,000 - pressure
32,000 -

A-13-A mask to D-2

H2 - Emergency O₂ Bailout bottle

Hi-Press syst. 18-2100 Don't Drop.

Hi Rocketing effect.

check - pre-flight.

Caution tag - Remove when get in on ground.

10 min supply

P.D. McCripe

(Pre-flight O₂ syst. check)

Press + quant. gage

Diaphragm reg.

Mask

1. Pr. checks

Connections at mask

1. Rubb. seal

2. 10-20 # pull

3. Alligator clamp - clamp by 1st 3-4 teeth

Connections at Regulator

1. Metal clamp

2. Regulator hose

3. Knurled knob

Regulator

1. Automix lever.

2. Pr. dial

Indicator

Portable Unit

1. Allig. clamp.

2. Pr. gage

3. Blow back check.

Emergency Cylinder (H-2 bailout bottle)

1. When over 25000 ft.

2. Full 1800 psi

Cabin Pressurization

Isobaric

Pressure Differential

Decompression rate

1. Vol. of hole
2. Size of hole
3. Press. diff.
4. Altitude

Emergency Exit (Ejection Seat)

1. Lower seat
2. Start bailout O₂
3. Duck

After Can. goes

Sit erect

Chin in

Feet in stirrups

Arms on rests, elbows in

Squeeze trigger

Leave seat

2-5 sec after ejection.

Release safety harness

Kick away seat

Automatic release, now

Release harness before ejection at low alt, 1000 ft or less.

Hi-speed bailout - hazards

1. Free-fall to 15000 ft.

60

2. Tumbling + flat spin

Time - count 101, 102 up to

Hypoxia, Hyperventilation, + CO (1/5% short time)
2.7% over long time
1/100% industry