OXYGEN CONSUMPTION

A common question is how long will a specific size oxygen cylinder provide a pilot with oxygen. The actual duration depends upon a number of factors, such as:

a) type of equipment and how it is used,
b) initial pressure in the cylinder,
c) the use altitude (temperature and pressure),
d) amount of leakage or other losses,
e) the rate and depth of breathing - a function of activity, nervous and excitement, and
f) contingency or emergency.

Because of these factors, any consumption values are estimates and must be treated as such. Consumption values that can be used to estimate duration are as follows:

	- Liters per minute -		- Cubic feet per hour -	
Altitude	EDS	Nelson	Diluter-Demand	
	"D" Mode*	A-4 Flowmeter**	(Normal)	(100% Oxygen)
10000	0.433	0.3	3.82	17.85
15000	0.682	---	5.07	14.35
18000	0.828	0.9-	----	-----
20000	---	0.9+	6.15	14.30
25000	---	1.5	6.95	8.75
30000	---	---	6.57	6.75
35000	---	---	4.87	4.87

*Based on a respiration rate of 20 times a minute, typical values may be substantially less.
**Only obtained by properly matching flow setting with altitude.
***1 liter per minute equals 2.12 cubic feet per hour.

	Tank Sizes*			
Cylinder	Volume	Charged Wt.	Overall Length	Diameter
	cu.ft.	lbs.	inches	inches
15	15.2	11.5	18	5-1/4
22	22.0	13.5	23	5-1/4
38	38.4	21.5	24	6-1/4
D	14.6	9	21	4-1/4
E	22.0	15	30	4-1/4

*At 1800 lbs/sq.in.(psi) cylinder pressure.

An estimate of a full cylinder's duration can be determined by dividing the cylinder's volume by the appropriate consumption rate given above. To estimate the oxygen available in flight, one can use the ratio of indicated cylinder pressure to 1800 psi which is also the ratio of volume or duration available in relationship to that of a full cylinder. Remember this is only an estimate, and it is important to maintain adequate margins so as to not empty the oxygen during a flight.

The cylinder pressure should never be allowed to reach zero pressure. A positive pressure assures the interior of the oxygen cylinder does not become contaminated (particularily with water vapor). Furthermore, proper oxygen regulation may not occur at lower pressures (100 psi) depending on the equipment. Many pilots use 200 psi as a minimun value to provide margin.

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