

How to Calculate Your SAC Rate

...and Why You Should Care

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Motivating Questions

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- ▶ My buddy is my girlfriend. Should I carry a bigger tank? How much bigger?

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 - ▶ A small steel tank at 3550psi may contain the same volume as an aluminum tank at 3000psi.

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- ▶ For most new divers, this value is around .75 cuft / min, and usually ranges between .35 and 1.0. (The “bar” is implied.)

How much Gas for my Safety Stop?

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 - ▶ So, the ascent will require,

$$2.4\text{bar} \cdot 3\text{min} \cdot .5\text{ cuft /barmin} = 1.2\text{ cuft /min} \cdot 3\text{min} = 3.6\text{ cuft} .$$

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- ▶ So, in total, I need six cubic feet of gas.

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 - ▶ My Luxfer AL80 has a "full" capacity of 77.4 cuft at 3000 psi. So, $3000/77.4 \approx 39\text{psi/cuft}$.
 - ▶ So, I will use $39\text{psi/cuft} \cdot 6\text{ cuft} = 234\text{psi}$ on my way up, and need to start up when my gauge reads 734psi.

Calculating SAC - Constant Depth Swim

- ▶ Descend to a specific depth (preferably deeper than 30ft). Record starting psi, swim for five to ten minutes, and record ending pressure.

$$\text{Gas Consumed} = \frac{(\text{psi start} - \text{psi end})}{\text{tank psi / cuft}}$$

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- ▶ Example

$$\frac{1500\text{psi} - 1000\text{psi}}{39 \text{ psi / cuft}} = 12.82 \text{ cuft}$$

$$\frac{12.82 \text{ cuft}}{2\text{bar} \cdot 10\text{min}} = 0.64 \text{ cuft / min}$$

From Dive Computer

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- ▶ Using that number, you can calculate your SAC rate for the dive from your start and ending psi.

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- ▶ Example of great dive software (free and open source):
<https://subsurface-divelog.org/>.