

Dissimilar Tank Matching

Joe Stillman 6/28/13

Dissimilar Tank Matching helps divers plan against out of gas emergencies. The purpose is to make sure that each diver may not use more available gas than the diver with the smallest volume. This helps to prevent divers from running out of gas should an emergency arise and they need to share gas.

Let's start with a common example of Dissimilar Tank Matching. Two divers are ready to make a dive, but one has a pair of LP85's and the other has a pair of LP95's. Also, each of their tanks are filled past their rated service pressure, thus giving them an even larger volume of breathable gas than the rated volume of the tank. To ensure that both divers are using the same volume of gas during the dive, we need to calculate their total volumes, their thirds volumes and then use calculations from the smaller volume diver to figure out the larger volume diver's turn pressure.

To help figure this out more quickly, we will skip a lot of math and just use Tank Factors*.

Tank Factors (TF)**

AL80 = 5

LP85 = 6

LP95 = 7

LP108 = 8

Example

DIVER 1 LP85's @ 3600psi	DIVER 2 LP95's at 3800psi
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How much volume does each diver have total and what is the Thirds volume for each?

Volume = TF x psi (in 100's) = 6 x 36 = 216ft ³ Thirds = 216/3 = 72ft ³ usable gas	Volume = TF x psi (in 100's) = 7 x 38 = 266ft ³ Thirds = 266/3 = 88ft ³ usable gas
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Note that we drop the 00's off the PSI and add it back on at the end of the calculations later on.

You can clearly see which diver has the larger gas volume. Since each diver can breathe no more gas than the diver with the smaller volume, we will calculate both turn pressures based on the smaller volume.

The Smaller Volume Diver will divide his Thirds Volume by his own Tank Factor

The Larger Volume Diver will divide the SMALLER Volume Diver's Thirds amount by his own Tank Factor

Thirds PSI = 72/6 = 12 (in 100's) = 1200psi	Thirds PSI = 72/7 = 10 (in 100's) = 1000psi
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Note that we add the 00's back to the end of the final PSI.

Now we calculate the turn pressure by subtracting these numbers from the starting pressure of the tanks.

Starting Pressure 3600psi – 1200psi = 2400psi Turn Pressure	Starting Pressure 3800psi – 1000psi = 2800psi Turn Pressure
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The main thing to remember is:

Always divide the SMALLER of the Thirds Volumes by each diver's OWN Tank Factor.

*Tank Factors are basically just the rounded numbers that come from dividing your tanks rated volume by its service pressure. This number gives you the CuFt per PSI.

For example, an LP85 with a service pressure of 2640psi holds 85CuFt of gas. To get the tank factor, you divide the rated volume of 85CuFt by the rated service pressure of 2640psi and get .032CuFt/psi. For doubles we just double this number to .064. To make it easier to do the math, we simply move the decimal over two places and use the whole number of 6. It comes out close enough to safely use these numbers. The same applies for the other sized tanks.

**All stated tank factors are based on doubles.