# Computing Cubic Feet per Minute (CFM)

Many compressors have inaccurate marketing CFM information. This procedure will identify a reasonably accurate CFM rating at current conditions.

> *Marketing information generally uses SCFM ratings, which defines a CFM measurement at a"Standard Condition" (Ex. 68 degrees F at sea level with 36% relative humidity). The actual CFM at any given time is affected by current air temperature, humidity, atmospheric pressure and elevation. These factors significantly affect the amount of air that is pumped into the tank.*

The way to measure true CFM *(at current conditions)* is to identify the time it takes the compressor to increase the tank pressure from a known starting pressure point (low pressure point) to a known ending pressure point (high pressure point). With that information, you can calculate the true CFM at current conditions.

An accurate pressure gauge is critical for this procedure.

A stop watch is required.

Most air compressors commonly pump tanks up to 125 or 175 PSI. CFM ratings are generally stated for a specified PSI. CFM ratings will be higher at lower tank pressures and lower at higher tank pressures.

Since most pneumatic tools are run at 90 PSI, 75 to 105 PSI is a reasonable range to compute CFM for. If used, 75 would be the low pressure point referenced in the procedures… 105 would be the high pressure point.

> *An alternative is to just observe and time the normal start/stop pressures of the compressor. Just bleed the air out until the compressor starts and record the time it takes to pump up and stop.*

Use the worksheet following the procedure to record values identified or computed for each step.

**(1) Identify the volume of your air compressor tank in cubic feet.**

If the number of gallons in the tank is known, divide that number by 7.48.

> *If the number of gallons isn't known, compute the cubic feet in the tank using the following formulas.*
>
> *(A). 3.1416 (Pi) times radius-squared (inches) times length-of-the-tank (inches)*
>
> > *If the tank ends are rounded, measure from the end of one round to the start of the round on the other end of the tank. Use this value for the length (adjust if desired).*
>
> *(B). Divide the result from (A) by 1728*

Record the answer as the number of cubic feet in the compressor tank.

**(2) Prepare the compressor and initiate the measurement.**

> *Preparation entails ensuring the compressor is running and the tank pressure is at least 10-15 PSI lower than the low pressure point.*

Record the low pressure point to be used during the measurement.

Open a valve to release air from the compressor tank. When the pressure reaches 10-15 PSI lower than the low pressure point, close that valve.

> *If you are using 75 to 105 PSI for the low-high pressure range, you would let air out of the compressor until the tank gauge reads 65 PSI or less).*

Watch the tank gauge as the pressure increases and start a stopwatch when the pressure reaches the low pressure point.

**(3) Observe and time the pressure increase.**

When the tank pressure reaches the high pressure point, stop the stopwatch.

> *If the compressor stops before the tank pressure reaches the high pressure point, stop the stopwatch and use the pressure achieved as the high pressure value.*

Record the high pressure value.

**(4) Convert the time observed on the stopwatch to minutes.**

Record the time in minutes.

**(5) Compute pressure rise value.**

Subtract the low pressure value from the high pressure value.

Record the result as the difference in pressures.

**(6) Compute the Atmospheric Pressure Units added to the tank.**

Divide the result from Step (5) by 14.7.

Record the result as the Amount of atmospheric pressure units added

**(7) Compute the number of cubic feet the compressor pumped.**

Multiply the volume of the tank (expressed in cubic feet, recorded in Step 1) by the amount of atmospheric pressure units added during the pressure increase (calculated in Step 6).

Record the answer as the cubic feet the compressor pumped

**(8) CFM computation.**

Divide cubic feet pumped (results of Step 7) by the minutes recorded in Step 3.

**The result will be the CFM of the compressor for the pressure range measured *(at current conditions)*.**

# Worksheet

**Compressor Measured:**

1. **Number of cubic feet in tank**

2. **Low pressure point**

3. **High pressure point**

4. **Number of minutes passed during pressure rise**

5. **Low to High Pressure difference**

6. **Atmospheric pressure units added**

7. **Cubic feet the compressor pumped**

8. **CFM**