

Engine Air flow by displacement

<https://www.cui.com/product/resource/calculators/airflow-conversion>

Liters to cubic inches.

<https://www.asknumbers.com/liters-to-cubic-feet.aspx>

Calculation of air flow for an internal Combustion Engine.

<http://www.widman.biz/English/Calculators/CFM.html>

Air Flow Calculation

One of the most important factors in air filtration is the determination of the right size filter for the engine. Each filter is designed for a certain air flow. Adapting any filter to an engine requires a consideration of the air flow required by the engine as well as the resistance of the filter and ducting.

The engine manufacturer should specify the technical information required for this air consumption (CFM).

When we don't have the airflow numbers, we can use the general rule of 2.5 times the horsepower of the engine to get an approximate amount of air required.

If we want to calculate the CFM (Cubic Feet per Minute) for a 4 cycle motor we can multiply the cubic inch displacement of the engine by the maximum rpm (Revolutions Per Minute) and divide the result by 3456. Then we multiply the results by the volumetric efficiency of the motor.

The volumetric efficiency is a factor determined by the efficiency of the turbo, the electronic control systems, the type of fuel injection and the variation of valve timing or opening.

A carbureted engine normally has a volumetric efficiency of 0.70 to 0.80, but the electronics can raise this figure as high as 2.0.

A diesel engine (2 cycle or 4 cycle) normally has a volumetric efficiency of 0.90.

A turbo can raise the volumetric efficiency to between 1.5 and 3.0. If you don't know this value for your turbo, it is best to use 3.0.

To simplify the calculation, we developed this calculator.

To use it:

Select the measurement you would like: Cubic Centimeters (ex: 2400) or Cubic Inches (ex: 289)

Enter the maximum velocity (RPM) you expect from your engine (ex: 4000)

Select the type of engine between the four options, or select "Enter a specific value" and enter the volumetric efficiency that you would like to use (ex: 2.8). When you select one of the four engine types, the maximum values will be used.

The results will be shown in CFM and Liters per Minute.

Calculation of Air Flow for an Internal Combustion Engine			
Engine Size	<input type="text" value="Cubic Inches"/>	<input type="text" value="360"/>	
Revolutions per Minute (rpm)	<input type="text" value="Enter the Maximum Expected"/>	<input type="text" value="2000"/>	

Volumetric Efficiency	<input type="text" value="Diesel engine with Turbo"/>		<input type="text" value="3"/>	<input type="text" value="0"/>
Results	CFM (Cubic Feet per Minute)			625
Liters per Minute of air required at maximum velocity (rpm)				17,700

Velocity – 3,183---Ft. / Min. LFM

Volume – cubic Ft. / Min. 625

Velocity – Meters / Second 16.17

Volume – Meters Cubed / Hr. 1,062

Velocity – Miles / Hr. 36.2

Volume – Liters / Sec. 295