

This is a general guide to notes, improvements and corrections made to the software.

- **Languages and Units**

There are two copies of every program except for the carbon dioxide control program. They are intended to support both English and SI Units.

- **Using Air Pump and LHO programs**

In order for these two programs to work, all of the files under that heading must be saved in a folder directly on your desktop and all its names and structures must remain the same. This is due to specific pathways used by Excel to create the graphs.

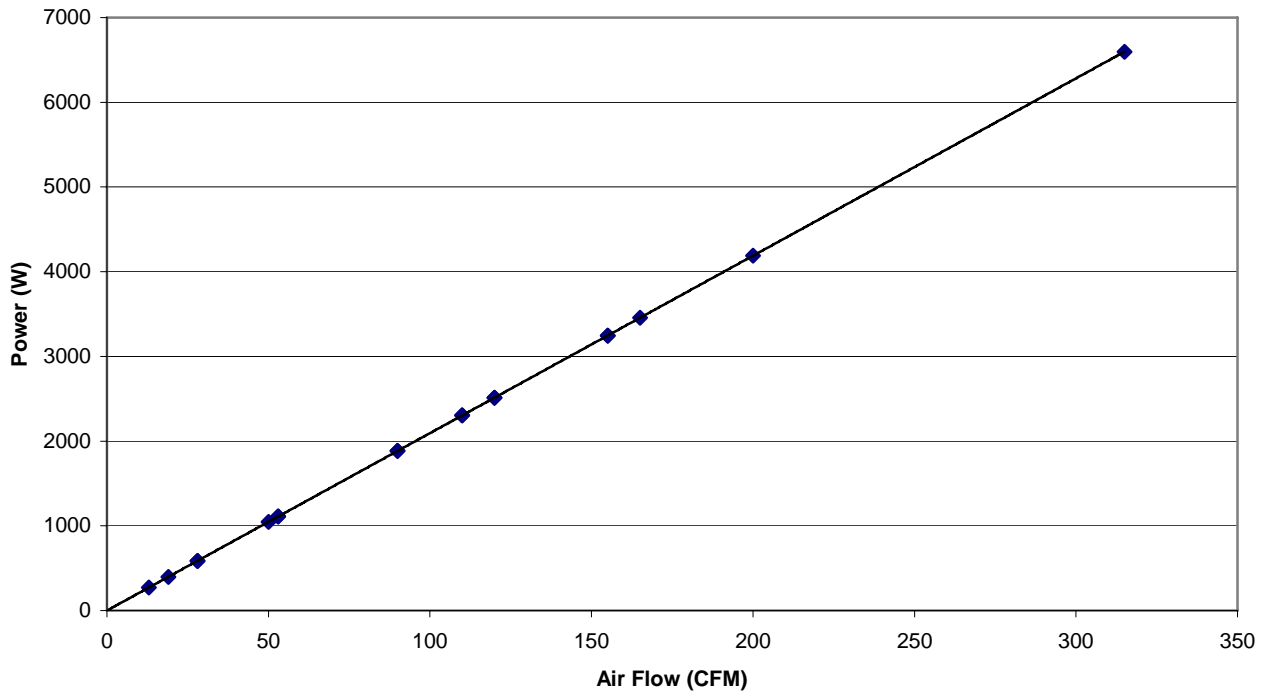
- **Calculating the Power Input in the Air Pump program**

The power input that is presented in the output screen of the Air Pump program is a THEORETICAL value that is calculated under the assumptions of the pump working at optimum conditions and with the whole system tweaked perfectly to support such performance. Being a solely theoretical value, it is well below any actual power consumption measurements.

A better estimate of the actual value of power was obtained by making power consumption a function of depth and air flow. Using the assumption that power consumption = 0 W when air flow = 0 CFM and depth = 0 meters and data from different blowers used in conjunction with airlift pumps, we calculated the data's regression. These statistics demonstrated that there was no statistical significance to the correlation to depth, perhaps because the blower consumes the same amount of power at all depths (though depth thus influence how much air you are moving, this is independent of the power used). Utilizing the coefficient associated with air flow and the data from the blowers, we estimated the power output and plotted the following empirical graphs.

Have fun!

Regression Calculation of Power Usage



Regression Calculation of Power Usage

