Compare the Efficiency of

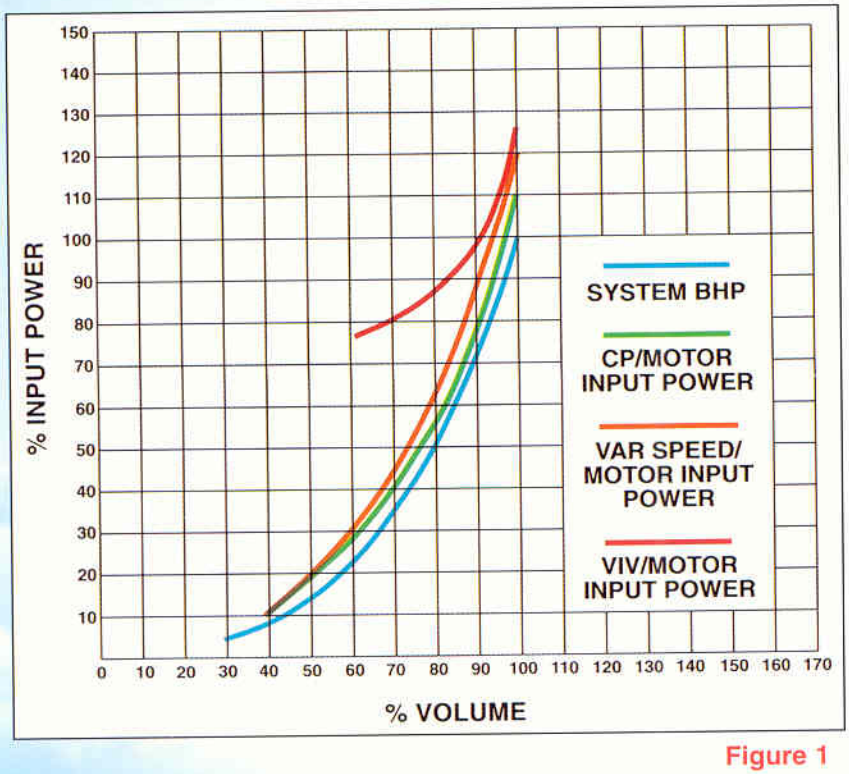
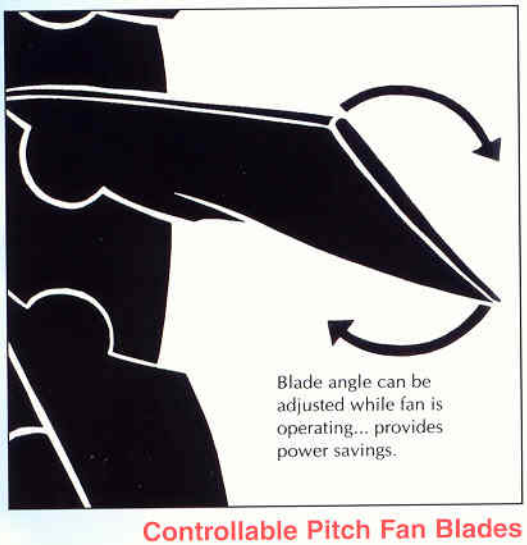


Figure 1



Controllable Pitch Fan Blades

To properly compare various methods of volume control, you need to look further than just brake horsepower savings. Owners do not pay for brake horsepower, they pay for electricity consumed (input power). Inefficiencies in powered equipment should be included in any comparison of volume control methods. **Figure 1** depicts the power consumption of various types of volume control apparatus applied to a fan operating on a normal system curve (where the required pressure varies as the square of the volume of air). The blue line depicts the **system brake horsepower** requirements as a percentage of the full load requirement. The other lines depict the input power requirements for the various types of volume control when applied to this system in conjunction with a 90% efficient motor.

1. The green line indicates the **input power** required for a controllable pitch VAV Vane axial fan. Note at full load, since we are using a 90% efficient motor, the input power requirement is greater than 100%.

2. The orange line indicates the **input power** required when applying an adjustable frequency speed controller to the same fan (published data from manufacturer of adjustable frequency speed controller). Note at full load, the input power requirement is greater due to inefficiencies in both motor and speed controller.

3. The red line depicts the **input power** required for the same fan utilizing an inlet vane control damper.

Note that until you exceed 50% turndown, the Controllable Pitch fan requires less power than the adjustable frequency speed controller. This is due to the inefficiencies in the frequency control apparatus.

At 80% of full load flow, the controllable pitch fan consumes 15% less power than the adjustable frequency and 39% less than a variable inlet vane damper.

At 70% of full load, the controllable pitch fan consumes 10% less power than the adjustable