



Useful Formulas

Electrical cost

= HP x .746 x hours x Kw cost / motor efficiency

Example: 50 hp air compressor that runs 8 hours a day 5 days a week for a year with a \$.06 Kw electric rate and a 90% efficient electric motor.

50 hp x .746 x 2080 hours x \$.06 / .90 = \$5,172.27 per year

Compressor RPM

= motor pulley diameter x motor rpm / compressor pulley diameter.

Motor pulley diameter

= compressor pulley diameter x compressor RPM / motor RPM

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Motor RPM

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Gallons

= cubic feet / .134

Cubic Feet

= gallons x .134





Pump up time (minutes)

$$= \frac{V \text{ (tank size)} \times (\text{final pressure} - \text{initial pressure})}{7.48 \times \text{atmospheric pressure} \times \text{pump delivery (cfm)}}$$

Example: 7.5 hp compressor rated at 24 cfm with an 80 gallon tank – unit starts at 100 psi and turns off at 150 psi.

$$\frac{80 \text{ gallons} \times (150 \text{ psi} - 100 \text{ psi})}{7.48 \times 14.7 \text{ psi} \times 24 \text{ cfm}} = \frac{4,000}{2,638} = 1.51 \text{ minutes}$$

Pressure drop and horsepower:

Every 1 psi of pressure drop equals 0.5% in horsepower

Heat and horsepower :

Rejected heat from an air-cooled compressor is equal to total machine horsepower x 2,545 BTU per hour

Example: 50 hp compressor with 3 hp fan motor will produce...
53 hp x 2,545 = 134,885 BTU per hour

