

COMPRESSED AIR RULES OF THUMB

Compressed air systems have a few rules of thumb that may be of benefit when analyzing utilization, efficiency and performance of a system. This information can be helpful not only in determining the current state of a system, but also how well changes to the system contribute to the overall performance. The rules of thumb are below.

1. Each two (2) psi decrease in the outlet air pressure will save 1% brake horsepower.
2. Each 10 °F drop in inlet air temperature will save 1.9% energy.
3. Higher relative humidity of inlet air will make the compressed air system inefficient. First, it lowers the molecular weight, thereby reducing the mass flow; and second, the moisture drops out in the dryer reducing further the effective dry air mass flow. This will result in increasing the run time and electrical energy consumption of the compressor system. The following table shows the impact of increasing relative humidity on reducing the dry compressed air to the plant.

% Relative Humidity in Air	% Dry Air Reduction
0%	0.00%
25%	1.38%
50%	2.56%
75%	3.64%
100%	5.01%

4. As much as 80-93% of the electrical energy used by the industrial air compressor is converted into heat. A heat recovery unit may reclaim as much as 50-90% of this thermal energy and put it to useful work heating air or water.
5. Annual operating cost of a compressor normally exceeds its first cost. A 100 HP air compressor running 8000 hours per year at a rate of \$.05 per kWh, will cost approximately \$45,000 annually in power cost.
6. A 1/16" diameter leak costs \$523/year, a 1/8" diameter leak costs \$2,095/year, and a 1/4" diameter leak costs \$8,382/year; assuming electricity cost of \$.05 per kWh and 100 psig discharge pressure.

Brett Easterling
Sales Compressor Division
I&M Industrials, Inc.
Greenville SC
www.iandmindustrials.com