

HOW MUCH IS ½”Hg VACUUM WORTH TO YOU?

QUESTION:

If one of our vacuum pumps could improve your condenser vacuum by a half-inch of mercury (0.5”HgA) what would it be worth?

ANSWER:

Each plant has different operating characteristics, but calculating the answer is simply a matter of gathering some data and multiplying.

1. In your “Turbine Data File” there should be a graph or table that shows Turbine Efficiency Improvement as a function of turbine back pressure [condenser absolute pressure]. We recently saw one that indicated a **0.3%** improvement if the back pressure were dropped from 2.5”HgA to 2.0”HgA.
2. Determine the Turbine Heat Rate, which is the Btu input to the turbine required to produce a kilowatt of electricity. A typical value is about **8500Btu/kW**.
3. Determine the cost of fuel. A recent spot price for natural gas was **\$ 2.50 per million Btu's**.

Use the following calculation:

$$[0.003] [8500 \text{ Btu} / \text{kW-hr}] [\$2.50 / 10^6 \text{ Btu}] = 6.375 \times 10^{-5} \$ / \text{kW}$$

This appears to be insignificant until we factor in the amount of power produced over an entire year. If the plant is rated at **500 MegaWatts (500,000 kW)** and it operates **8000 hours per year**:

$$[6.375 \times 10^{-5} \$ / \text{kW}] [5 \times 10^5 \text{ kW}] [8 \times 10^3 \text{ hr}] = \$ 255,000 \text{ per year}$$

Now that's a figure worth considering! A fraction of this will purchase a healthy sized vacuum pump. All of this, however, depends on the conditions at your particular plant. Plug in your own data and see if it's worth sending us an enquiry.

Call us at 1-888-925-5444 or e-mail us at sales@dekkervacuum.com