MAY 2019

from experience

Bringing the Outside In:
Reducing Energy Costs for Air Compressors

It's a fact: Less horsepower is required for an air compressor to run with cooler intake air. Every 5^0F drop in air inlet temperature can result in approximately a 1% increase in compressed air with the same horsepower input.

In many plants, though, air intakes for air compressors are located in the same room with the compressors, boilers or both. Temperatures in these rooms can average 20^0F or more above ambient.

Because of this, plants looking for ways to reduce energy costs may want to consider running ductwork for the intake air to an outside wall when performing a retrofit or upgrade to the facility. This solution will provide payback; however, it is important to note that this payback could take one year, three years, or more to be realized, depending on a number of factors (e.g., the distance of the compressor to an outside wall). Better yet, when building a new facility or addition, keep the air inlet temperature in mind as a way to lower energy costs from the start by specifying that intake air be pulled from a cooler source than the compressor/boiler room.

In the example below, a 35^0 reduction in air intake temperature saves over 25,000 kWh per year in energy consumption.

Equipment Description	Reduced Electrical Usage	Current Air Capacity	Alternate Air Intake Temperature	Current Air Intake Temperature	Daily Run Time	Annual Run Time
	kWh/yr	*Std. cubic ft./minute (scfm)*	*^{0}F*	*^{0}F*	*Hrs/day*	*Days/year*
Two 200 scfm compressors	25,066	400	55*	90**	16***	300***

In the table above:

- **55^{0}F is an average air temperature over one year (day/night, summer/winter).*
- ***90^{0}F is a typical air temperature within a utility space, but will vary by plant.*
- ****Average number of hours per day and days per year, including machine cycles and production stoppages.*

Additional information on compressed air, including air leaks and reducing pressure, is available in past issues of From Experience. Please contact us to learn more about these topics.

experience in brief

The following formula can be used to calculate potential energy savings that can be generated by installing intake ducts to pull in outside air:

Air Demand (scfm) x Temperature Decrease (^{0}F) x 1%/5^0F x 1 Hp/ 4scfm x 0.746 kW/Hp x Duration hours/year = kWh/year

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