ELECTRICITY OF COMPRESSORS AND FANS

ENERGY SAVING WORK MODES

Jumanov Abbos Nabijonovich

Energy Department Assistant., Jizzakh Polytechnic Institute

Jalilov O‘rinboyAbdunayim o‘g‘li

Energy Department Assistant., Jizzakh Polytechnic Institute

Xofizov Sherzodxon Iskandarivich

Department of Energy Master 1st year., Energy saving and energy audit (heat energy)

Xo‘jaqulov Ravshan Abdusalom o‘g‘li

Department of Energy Master 1st year., Energy saving and energy audit (heat energy)

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Annotation: ***The quality of electricity in a country depends on frequency, voltage, current and voltage. In the winter months we have an increasing demand for electricity today to improve the quality of electricity. On this scale, we need to shorten the line long line so as not to increase the power losses in the overhead line. If we increase the voltage, we reduce the waste on the line, we must carefully choose the cutting surface of the wire.***

Keywords: ***Transformer, capacitor, accumulator, function, line length, we need to calculate and make a clear choice.***

Compressed air is widely used in all areas of production. For example, compressed air is used in the construction of industrial and civil buildings in concrete breakers, power hammers, grinders and vibrators, paint consoles and paint sprayers. Compressed air is generated in compressors. The power of motors in compressors can range from a few hundred watts to several thousand kilowatts. Synchronous motor compressors with a capacity of thousands of kilowatts are used to transport large volumes of gaseous media.

To reduce power consumption in compressor power plants, it is advisable to take the following measures:

1. Heat the compressed air and in the air duct

The application of thermal insulation reduces air loss, which

automatically reduces electricity consumption. In this case electricity

energy saving is calculated by the following formula:

$$\Delta Э = 0{,}22 \cdot Q \cdot \Delta T \cdot \omega \cdot t,$$

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where the amount of compressed air, m^3 / min, the difference in temperature between the thermal insulation device installed in the air duct and in the duct after the device (average value for the year), 0C, 1 m^3 of electricity consumed to obtain compressed air energy,

kW * s / m^3, t - time of operation of the compressor during the year, hours.

Example: Compressed air being sent to a consumer how much electricity does the compressor electric current save when we raise the temperature from 20^0C to 40^0C?

Solution: Q = 10 m^3 / min, t = 3000 hours, = 0.08 kW * s / m^3.

Electricity saved in a year

2. Compressed air leakage should be minimized. The power dissipation during air leakage is as follows is calculated by the formula:

$$\Delta Э = \alpha \cdot \mathrm{n} \cdot \omega \cdot t,$$

where air loss in fittings and clamps, m^3 / min, n – compressed the number of air leaks, t is the pressure of the air duct time, hours.

3. Working depending on the rated pressure of the compressor mechanisms must be selected. The pressure of a compressor is working power dissipation when the engine pressure is higher is calculated using the following formula:

$$\Delta Э = \frac{Д(A_1 - A_2) \cdot 60 \cdot Q \cdot t}{367200 \cdot \eta_t \cdot \eta_Э \cdot \eta_n \cdot \eta_m \cdot \eta_{ИН}}$$

where A1, A2 - the amount of work required to compress 1 m^3 of air before and after the pressure drop, kgm / m^3; Q is the amount of compressed air leaving the compressor, m^3 / min; t is the operating time of the compressor for a year, hours; electrical network, motor, transmission, compressor mechanics and indicator FICs; D is the result of the compressor breaking down during operation taking into account the increase in additional energy consumption coefficient. (D = 1.1).

15% reduction in compressor pressure electricity leads to a reduction of waste by about 8%.

4. Replacement of pneumatic tools with electric tools allows to save 7 - 10% of electricity.

5. 3% increase in the temperature of the extracted air the amount of compressed air leaving the compressor by 1% reduces, which increases electricity consumption. that is why usually the air intakes are painted white due to sunlight

must be protected.

6. Compressed compressor production capacity should be adjusted according to the change in air volume.

7. Shifts and compressors at lunchtime must be turned off.

8. Adjusting the reactive power of asynchronous motors in non-adjustable speed compressors depending on the load level is one of the main measures for efficient use of electricity.

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Metal structures and structures based on them for drying, as well as various for heating rooms fans are also widely used in combination with heaters. The motors used in them are mainly asynchronous motors power ranges from a few hundred watts to thousands of kilowatts.

Electricity consumed in ventilation devices the following practical measures should be taken to save money:

1. As a result of replacing an economically unsatisfactory fan with an economically acceptable one:

$$\Delta Э = \frac{thQ(\eta_2 - \eta_1)}{10^3 * \eta_2 * \eta_1 * \eta_Э * \eta_c}$$

where t is the operating time of the fan, hours; h is the pressure created by the fan. Pa; Q is the amount of air leaving the fan; m^3 / s; FICs of installed and replaced fans, electric motors, electric networks.

2. Fans during lunch and shift shifts (then the economy from electricity is 20%).

3. Improvement of fan design (worker change the angle of inclination of the wheels, correction of guide hardware blades, etc.). Electricity saved as a result of these measures determined by the following formula:

$$\Delta Э = \frac{(Q_1 h_1 \eta_1 - Q_2 h_2 \eta_2)}{10^3 * \eta_2 * \eta_1 * \eta_Э * \eta_c}$$

where Q1, Q2 - until the production mode is changed and then the amount of air leaving the fan, m^3 / s; h1, h2 - a fan is formed before and after the change of production mode pressure, Pa; until the production mode changes and then fan FICs.

4. Adjust the amount of air coming out of the fan the use of high-speed motors instead of slate allows to save 30% of electricity. The same frequency and the use of asynchronous speed controllers gives a lot of results.

5. When installing and repairing the fan shortcomings should be eliminated.

Inversely related to the outside air temperature schemes of automatic control system of ventilation devices practical application saves 10-15% of electricity will come.

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