

METHODS FOR INCREASING THE EFFICIENCY OF AIR COOLING DEVICES

¹Sunnatov Zafar Ubaidullaevich, ²Norinov Fakhriy Kurbonovich, ³Rakhmonkulov Murod Turdialievich, ⁴Boykobilova Makhliyo Makhmudovna
Karshi Engineering and Economic Institute

ANNOTATION

In this work, it was interesting to study changes in the composition and properties of petroleum products subjected to cavitation treatment and to determine the groups of hydrocarbons and individual compounds that are most susceptible to changes during processing.

Keywords. *composition of oil, clean fuels, gasoline fraction, fuel.*

Air coolers (AVO) are used for condensation or cooling. Air is used as a refrigerant in devices of this type, which, depending on the design of the AVO, is pulled through pipes that pump a gas or water medium, or is forced onto them by a fan. The air passing through the section heats up, and the product in the pipes is cooled or condensed. The fan is located in the center of the collector and receives rotation from the electric motor, without which the operation of the apparatus would be impossible. The choice of electric motors for production mechanisms is a very important process, which determines their uninterrupted and reliable operation throughout the entire standard service life. Depending on the decision on the choice of the electric motor and the drive, the received power is consumed rationally, which increases the efficiency of the apparatus and the productivity of its work [1, p. 55].

From the point of view of the design of the electric drive, all AVOs can be divided into three main types - AVOs with a direct fitting of the fan on the motor shaft, AVOs with a belt drive and AVOs with a gear drive (coaxial or perpendicular shaft). Each type of drive has its own advantages and disadvantages (see table 1).

As an example, a variant of energy saving is presented during the operation of the AVO apparatus at a compressor installation. After each stage of compression, cooling of associated petroleum gas (APG) is provided by an air cooler. The electric drive used in AVO has a V-belt transmission that is extremely ineffective for these climatic conditions.

Table 1.
Advantages and disadvantages of different drive types

AVO wire type	Positive sides	Negative sides
Direct shaft fit	No additional nodes: higher reliability, lower operating costs Low operating temperature is allowed (up to -60 C)	Low-speed electric motor: high weight and cost, low efficiency
V-belt transmission	Compact high speed electric motor Minimum maintenance	Problematic work at low temperatures (below -40 C) Reduced reliability due to the increase in the number of elements The need to adjust the tension force of the belts before starting

Reduction gear	Standard design of electric motors	Special design required, many materials of construction
----------------	------------------------------------	---

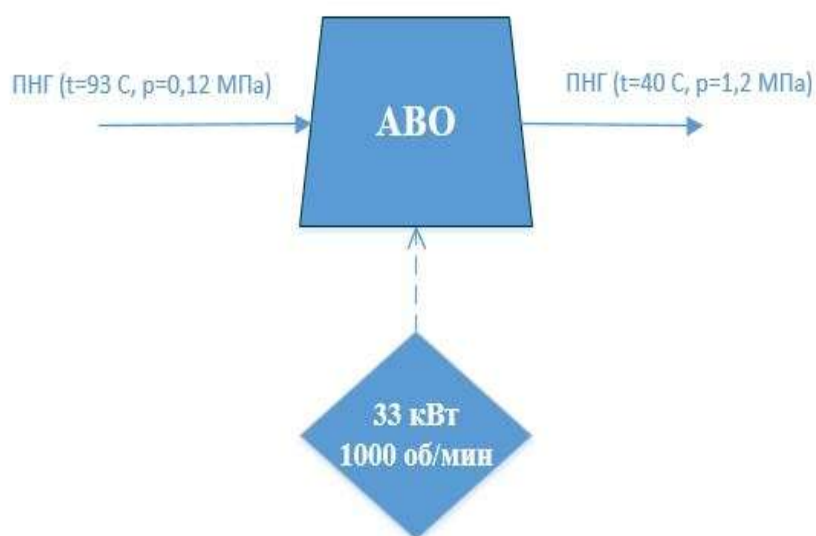
According to the analysis done, it was concluded that the above-mentioned drive was undesirable. A drive with a direct fit on the shaft in this case is also undesirable, since electric drives of this type are bulky and low-speed, problems with a loss of productivity of the apparatus and losses of the enterprise are inevitable. The most favorable solution is a gear transmission, in this case the proposed engine allows operation at low temperatures (up to -60 C), is reliable, requires less repair work and has a higher efficiency.

There are many varieties of electric motors, each of which has a number of both advantages and disadvantages. An integrated approach to the analysis and selection of the necessary equipment is required. An unreasonable approach to this issue will entail disruption of production processes, lead to losses of manufactured products and additional costs of electricity. [2, p. 82]. The choice of one of the electric motors will be considered correct if the following conditions are met:

1. The engine is fully consistent with the working machine in terms of mechanical properties.
2. Maximum power utilization in all operating modes
3. Compliance of the electric motor with the power supply parameters, the actuator and the conditions of the external environment in terms of design.

Based on the above conditions, it follows that the choice of an electric motor requires the type and name of the actuator, the maximum power on the shaft, the rotational speed of the actuator shaft, the method of its articulation with the electric motor shaft, as well as the characteristics of the external environment.

For the case under consideration, an electric motor of the 4A160S6 type was chosen, with a power of 11.7 kW, a speed of 975 min⁻¹ and the ratio of the maximum torque to the nominal torque equal to 2.



The results of the modernization can be seen in comparative table 2.

Table 2. Results of modernization

Characteristic	Belt	Gearbox
power, kWt	44	33
Rotation frequency, rpm	1450 2900	1000 3000
Electricity, per year, kW	385440	285440
Difference, kW	96	360

Thus, an analysis was carried out on the methods of modernization (see. table 2) of the air cooler, which serves to cool the associated petroleum gas.

LITERATURE

1. Алимов, С. В. Аппараты воздушного охлаждения газа: опыт эксплуатации и пути совершенствования / С. В. Алимов, В. А. Лифанов, О. Л. Миатов // Газовая промышленность. – 2006. – № 6. – С. 54-57.
2. Рыбкин, В. Оптимизация энергозатрат технологических процессов / В. Рыбкин, Жу Синь (Фрэнк), П. Шихан Брендан // Территория Нефтегаз. – 2009. – № 8. – С. 80-84.
3. Отабек Абдукаримович Мирзаев, Шавкат Серабович Турсунов // Теоретическая Обоснования Деформированного Состояния Оболочки Питающего Цилиндра Прядильных Машин // Oriental renaissance: Innovative, educational, natural and social sciences // 2021. 1092-1103 <https://cyberleninka.ru/article/n/teoreticheskaya-obosnovaniya-deformirovannogo-sostoyaniya-obolochki-pitayuschego-tsilindra-pryadilnyh-mashin>
4. T Khankelov, S Tursunov, Z Maksudov // Domestic Solid Waste Crusher // International Journal of Psychological Rehabilitation 24 (issue 07), 8090-8096 [psychosocial.com/article-category/issue](https://www.psychosocial.com/article-category/issue) <https://www.psychosocial.com/article/PR270784/18957/>
5. Tavbay Khankelov¹, Zokir Maksudov^{1*}, Nafisa Mukhamedova¹ and Shavkat Tursunov² // Crushing and screening complex for the production of compost from organic components of municipal solid waste // Interaction of Materials Resistance Science With Other General-Military Disciplines In Engineering Specialties // 2021. https://www.e3s-conferences.org/articles/e3sconf/abs/2021/40/e3sconf_conmechhydro2021_01026/e3sconf_conmechhydro2021_01026.html
6. Oliya Nurova Salomovna¹, Asror Nazarov Allanazarovich², Tursunov Shavkat Serabovich // Interaction of Materials Resistance Science With Other General-Military Disciplines In Engineering Specialties // <https://www.annalsofrscb.ro/index.php/journal/article/view/5911>
7. A.Nazarov and others. Methods for Conducting a Course Project on Machine Parts / TEST INGeineering management./ May – June 2020. ISSN: 0193-4120 Page No. 26595 – 26598. https://ejmcm.com/article_3873.html
8. Nazarov A. A. Principles of education that develop an innovative approach to engineering professional activities. / European Journal of Research and Reflection in Educational Sciences. Vol.8No.8,2020 ISSN 2056-5852. / <https://www.idpublications.org/wp-content/uploads/2020/07/Full-PaperPRINCIPLES-OF-EDUCATION-THAT-DEVELOP-AN-INNOVATIVEAPPROACH-TO-ENGINEERING-PROFESSIONAL.pdf>.