

controlling the gas distribution of an internal combustion engine in order to increase the overall efficiency.

### Materials and methods.

When considering the opening and closing angles of the intake and exhaust valves, we can conclude that there is a need to narrow the intake and exhaust phases (fig. 1).

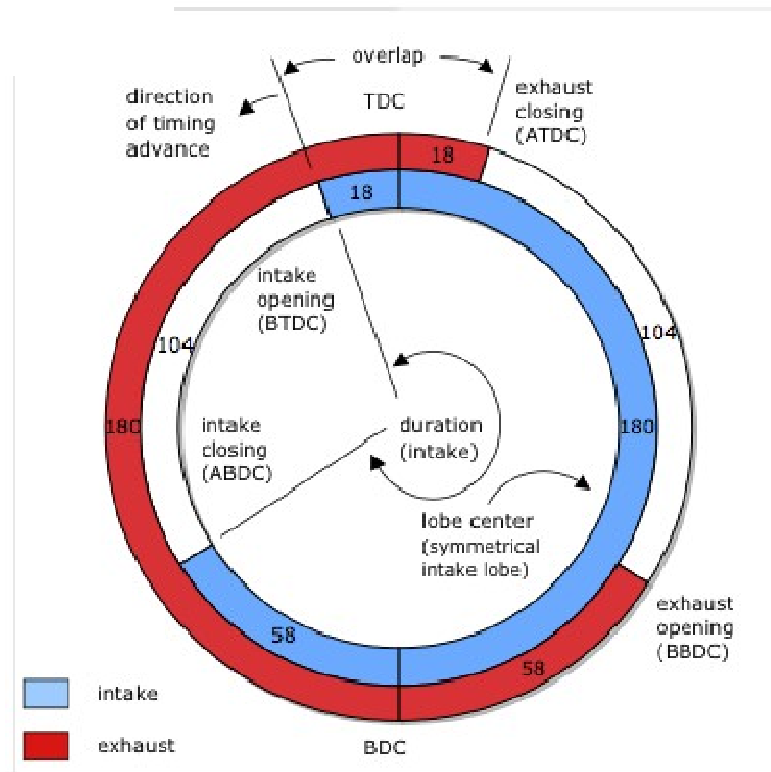


Figure 1 - Graph of change of efficiency of autonomous power supply from degree of compression

**Conclusions.** To increase the efficiency, it is necessary to reduce the values of the opening and closing angles of the intake and exhaust valves of the engine gas distribution system.

### References

1. Uvarov, S. N. Mobile power plants of high power / S. N. Uvarov. - L.: Energy, 1977 .- 159 p.
2. Zakharchenko V.N. Electrical equipment of ships: power plants / V.N. Zakharchenko; Odessa nat. pestilence. Acad. - O., 2003 .-- 120 p.

### MAIN CRITERIA FOR THE PREPARATION OF THE MASTER'S EDUCATION PROFESSIONAL PROGRAM "ELECTROMECHANICAL AND MECHATRONIC SYSTEMS OF ENERGY PRODUCTS"

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**Annotation.** The article is devoted to the main criteria of preparation of masters of educational - professional program "Electromechanical and mechatronic systems of energy intensive industries" specialty 141 - Electricity, electrical engineering and electromechanics. The current problem of modern higher education is the inconsistency of the structure and quality of specialist training and labor market demand. In this regard, one of the most important tasks of



today is to strengthen the dialogue between educators and employers. In order for such a dialogue to be constructive and social interaction effective, special tools are needed to ensure that the requirements that are placed on employers and higher education professionals at different levels of skill are brought to light.

**Keywords:** *Mechatronic, Electrotechnical and Electromechanical Systems and Complexes, Devices and Equipment, Control Systems, educational and professional program.*

In 2019, the Department of Electromechanical Equipment for Energy intensive Manufactures of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" of the Institute of Energy Saving and Energy Management is 30 years old.

All these years the staff of the department have been working to improve the training of specialists, who are capable of solving of complex problems and problems in the electric power, electrical engineering, electromechanical industry and to carry out innovative professional activity on the basis of higher education standards in engineering specialties with the requirements of Mobility International and EM Engineers International according to which the educational and professional program "Electromechanical and mechatronic systems of energy intensive industries" was developed. According to the educational and professional program, the department graduates bachelors and masters degrees in electrical engineering, electrical engineering and electromechanics.

The masters of the department during their studies get general competences : abstract thinking, analysis, synthesis; search, process and analyze information from various sources; use of information and communication technologies; application of knowledges in practical situations; use of foreign language for scientific and technical activities; making well founded decisions; independent learning and mastering of modern knowledges; identifying and assessing risks; the ability to work autonomously and in a team, identify feedback and adjust actions to take them into account.

The EMF requirements for the competencies of professional engineers in the Washington Accord Declaration set out the basic criteria for graduate preparation. Graduates of the department under the educational - professional program "Electromechanical and mechatronic systems of energy intensive industries" are focused on the specialty 141 - Electric Power Engineering, Electrical Engineering and Electromechanics. The main preparation criteria are: obtaining of an academic master's degree; application of scientific and technical methods for solving problems and problems of the specialty; application of existing and development of new methods, techniques, technologies and procedures for solving engineering problems of the specialty; planning, organizing and conducting scientific research in the field of electric power, electrical engineering and electromechanics; development and implementation of measures to increase reliability, efficiency and safety in the design and operation of equipment and objects of electric power, electrical engineering and electromechanics; analysis of technical and economic indicators and expertise of design solutions in the field of electric power, electrical engineering and electromechanics; research and identification of the problem and identification of constraints, including those related to environmental, sustainable development, health and safety issues and risk assessments in electricity, electrical engineering and electromechanics; taking into account social, environmental, ethical, economic and commercial considerations that influence the implementation of technical solutions in power engineering, electrical engineering and electromechanics; project management and evaluation of their results; developing plans and projects to ensure that the goal is met, taking into account all aspects of the problem being solved, including the production, operation, maintenance and disposal of equipment of power, electrotechnical and electromechanical complexes; use of legal acts, norms, rules and standards in power engineering, electrical engineering and electromechanics; the use of IPR methods to further commercialize them, including the sale of licenses and technology transfer; publication of research results in scientific journals; formulation and preparation of technical tasks for the development of previously unknown, design solutions of equipment elements



and objects of activity as a whole in the conditions of uncertainty and competition with the use of regulatory documentation, modern methods of information search and processing, design automation tools based on modern information systems and best practices; development of methodological and normative documents, proposals and measures for implementation of the developed projects and programs, examination of technical documentation; conducting a patent search in order to ensure patent purity of new design decisions with determination of technical level indicators of the designed products of electromechanical and mechatronic systems; conducting analysis of competitive developments and implementation of feasibility study of design solutions, application of innovative technologies to solve engineering problems; development and implementation of energy and resource-saving measures in the design and operation of electromechanical and mechatronic complexes using the latest achievements; based on the analysis of static and dynamic loads, mode characteristics, to calculate and develop optimal equipment designs and operating modes of simple and complex electromechanical complexes using modern computer mathematical modeling methods.

There is a constant demand for specialists in electromechanical and mechatronic systems of energy-intensive industries thanks to the thorough preparation of masters, as well as the possibility of using the graduates of the department in almost all spheres of human activity, . This fact is confirmed by the full employment of the graduates of the department. The department of electromechanical equipment and energy-intensive industries is fully provided with long term contracts with enterprises for graduates.

#### References

1. EngineersMobilityForum: <http://www.ieagreements.com/EMF>
2. GraduateAttributesand Professional Competencies: <http://www.ieagreements.com/GradProfiles.cfm>
3. Educational and professional program Electromechanical and mechatronic systems of energy-intensive industries of the second (master's) level of higher education. <https://osvita.kpi.ua/node/103>

UDC 621.513.004.68

### VARIANT ENERGY SAVING IN A COMPRESSOR INSTALLATION

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**Annotation.** *The effect of cooling on the lowering of specific energy consumption of the air compression by the compressor installation was investigated with the help of an exergy method of thermodynamic analysis.*

**Keywords:** *compressor installation, specific energy consumption, temperature, exergy method of thermodynamic analysis.*

**Анотація.** *З допомогою ексергетичного методу термодинамічного аналізу досліджено ефект впливу охолодження на зниження питомих енерговитрат стиснення повітря ступенем компресорної установки.*

**Ключові слова:** *компресорна установка, питомі енерговитрати, температура, ексергетичний метод термодинамічного аналізу.*

**Introduction.** The considerable energy intensity of compressor installations (KI) is explained by the physical phenomenon of simultaneous increase of the air temperature when it is