STUDY OF THE MONOBLOCK OPERATION OF A REFRIGERATION CHAMBER UNDER DIFFERENT OPERATING CONDITIONS

Bannyk O. S., Tuchin V. I.

National Technical University «Kharkiv Polytechnic Institute», Kharkiv

The study of monoblock operation is of practical importance for improving the performance, efficiency, and environmental sustainability of refrigeration systems. Research into monoblock efficiency helps identify factors that can be optimized to increase productivity and reduce energy consumption. This is a key aspect in the development of modern energy-efficient technologies, as monoblocks are widely used in commercial refrigeration.

Various operating conditions of the monoblock were simulated in a special chamber designed for research purposes. A series of tests were conducted to evaluate the impact of refrigerant charge on monoblock performance. Additionally, the influence of condenser efficiency on the overall system operation was examined, along with different operating scenarios: ambient temperature, chamber load, and door opening frequency.

Based on the study of the refrigeration chamber monoblock under different operating conditions, conclusions were drawn regarding the system's performance and reliability.

System Efficiency: the study showed that the monoblock demonstrates high operational efficiency under optimal temperature conditions and appropriate humidity levels. Product storage efficiency and temperature stability meet standard requirements.

System Reliability: the system exhibited a high level of reliability with proper maintenance and regular monitoring of equipment condition. Minor operational deviations mainly occurred due to improper use or maintenance shortcomings.

Monoblock performance depends on the correct selection and tuning of system operation modes.

Different operating conditions–such as temperature, humidity, load, and type of refrigerant–significantly influence monoblock performance.

Optimal conditions contribute to increased productivity and service life of the monoblock.

The study provided recommendations for monoblock manufacturers regarding optimal operating conditions, identified critical factors that reduce energy efficiency, and proposed algorithms for potential improvement in monoblock control systems.