

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ОДЕСЬКА НАЦІОНАЛЬНА АКАДЕМІЯ ХАРЧОВИХ ТЕХНОЛОГІЙ
ПРОМИСЛОВО-ТОРГОВЕЛЬНА КОМПАНІЯ ШАБО**

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з міжнародною участю**

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здорового способу життя у молоді»**

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ЕКОЛОГО-ЕНЕРГЕТИЧНІ АСПЕКТИ
ЗДОРОВОГО СПОСОБУ ЖИТТЯ

DESIGNING OF TRANSPORT ABSORPTIVE REFRIGERATING APPARARUSES FOR CONTINUOUS REFRIGERATOR CHAIN

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The creation of the transport refrigerating devices of small productivity is actual for modern economy of farmers and agricultural workers of Ukraine.

Such apparatuses may be used for delivering of cool and frozen agricultural products to the markets and also for work in continuous refrigerator chain, for example, as apparatuses for primary freezing processing of milk and products, received from milk directly in the place of their production. The native and foreign producers propose transport refrigerators on the basis of compressive refrigerator machines. These apparatuses, as a rule, are fixed on separate transport facilities and do not suit small agricultural producer because of high cost and productivity.

Interesting decision in this area can be found with the help of heat using refrigerator machines. Creators of such machines in many countries of the world were not once dealing with the question of using them on transport. As a rule, it was supposed that for the work of such apparatuses as a main source of energy we must use flow of heated combustion products of internal combustion engine. Effect from use of utilizing heat aggregates on transport is connected with fuel saving for driving of traditional refrigerator compressive aggregate.

During last years when designing new refrigerator models one takes into consideration negative influence of transport compressive refrigerator systems on environment due to considerable from escape through incompactnesses of stuffing-box condensations.

In contradiction to compressive systems the refrigerator machines working with the help of heat use natural working liquid – water (steam injector) and ammonia – water solution (absorptive), which are natural components of natural environment and do not cause formation of global warming and ozone layer depletion.

Of particular interest on transport among heat using refrigerator machines are apparatuses on the basis of absorptive refrigerator aggregates (ARA). The working liquid of absorptive refrigerator aggregate is ammonia-water solution (AWS) with addition of inert gas – hydrogen or helium. In ARA there is no electromechanical pumping equipment and transference of working liquid components are made in gravitation regimes which greatly

increases reliability of work and resource and allows to work without current sources.

The distinguishing peculiarity of ARA is the work of their heat-dissipated elements in natural convection regime without external incentives of circulation. This autonomy, reliability and increases operational resource of refrigerator, but compels creators to produce high enough pressure in order to get mass-overall parameters. So, in ARA models intended to work in temperate climate operational pressure is 20 bar and in the tropical climate – 30 bar. As has been shown by practice of using absorptive refrigerators on transport during many years and a lot of specific scientific researches, in connecting with changeability of influence, presence of jolting and slopes during movement of a vehicle does not provide critical influence on the work of ARA – refrigerator apparatus efficiency is retained practically on the level of work in the stationary conditions.

Nevertheless, despite of the presence of such perspectives, ARA finds slight application in composition of refrigerator devices on modern vehicles. Such sources of energy as torch devices and sources of constant electric current (12 V. and 24V.) are used.

As has been shown by the analyses, such situation is connected with absence of a system approach in creation of new models in this area of technique.

The aim of this work is elaboration of methods of designing transport refrigerators on the basis of ARA and later on methods of designing transport absorptive refrigerators. Refrigerator chamber is equipped with module removable ARA whose evaporators refrigerating capacity is from 15 to 50 Vt and which are installed in heat isolated blocks. Construction of “chest” type chamber allows to improve essentially operating characteristics of refrigerator apparatus so far as a main unfavorable influence of air exchange when the gates are open, is connected not with cool air escape but with flow of warm wet air from outside surroundings. Moisture is condensed on evaporator surface and freezes forming firstly a hoar frost layer and then an ice crust. In this case thermal resistance between evaporator and air in the chamber is increased the latter leads to operation period increase in the cooling (refrigerator) aggregate id.est. growth of the coefficient of the working period takes place and, consequently energy loss is increased during exploitation. Block construction of ARA evaporator allows to apply additional evaporating condensation head transforming devices (low temperature heating tubes and thermosiphones), which have low internal thermal resistance and are able to secure heat transformation on large distances.

In perspective we consider questions of utilization for the ARA work not only energy of heated gas flow from the vehicle engine, but also the possibility of using sun radiation energy with the help of original

constructions of flexible light leaders which is particularly actual on the stops and in addition allow to economize fuel.

**THERMODYNAMIC ANALYSIS OF PERIODIC
OPERATION AMMONIA-WATER ABSORPTION
REFRIGERATION UNITS IN ATMOSPHERIC WATER
GENERATION SYSTEMS**

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The usage of heat absorption water-ammonia refrigeration units in atmospheric water generation systems. A basic design of periodic operation AWRU. A method for thermodynamic calculations and analysis of AWRU PO cycles and modes of operation. Refrigerating capacity depending on the composition of water-ammonia solution, the temperature of the heating source, the ambient temperature of the environment.

INTRODUCTION

It is a common knowledge that one of the most valuable resources in the future of our planet is going to be fresh water, and the demand for water resources is already one of the main factors in global logistics of contemporary world, and this trend will only grow in the foreseeable future. One of the developments in water production technology is mechanical air dehumidification — condensation of water vapor on the surfaces with a temperature below the dew point.

In this case, there are great prospects for the methods associated with the work of independent generators of cold — chillers that are guaranteed to provide the temperature below the dew point temperature. A necessary condition for operation of compression refrigeration machine is the availability of electrical energy. At the same time, the majority of countries facing water scarcity are limited in energy resources, too. Often the readily available source of energy in there is the sun.

In this regard there have been developed original schemes of absorption water-ammonia refrigeration units of periodic operation (AWRU PO) based on solar collectors, which differ with autonomy and independence from the sources of electrical energy, and unlike heat-analogues (steam jet and lithium-bromide absorption) can be operated with air cooling of their heat-dissipating elements.

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