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DEVELOPMENT OF UNIVERSAL ABSORPTION REFRIGERATORS FOR OPERATION IN A WIDE RANGE OF ATMOSPHERIC AIR TEMPERATURES

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In the recent years, greater weight in the structure of agricultural production in Ukraine belongs to individual farms and farmers. In these farms arise the problems of forming a regular economical budget, including a major problem in the preservation of the grown crops for three to six months in commercial quantities and at minimal energy costs. However, the acknowledged fact in world practice is the loss of most of the harvest of agricultural products in the absence of adequate refrigeration storage. Currently, the bulk of Ukrainian harvested fruits and vegetables is traditionally stored in the basements, where during the warm seasons (August–November, April–May) the required temperatures (5-12°C) often cannot be maintained. To ensure the required regimes of storage, the market of household and commercial refrigeration equipment for small wholesale manufacturers offers national and imported demountable (panel) cold storages of volumes 3-9 m^3, equipped with compression refrigeration machines. In modern conditions in rural Ukraine, operation of such cells is hampered by lengthy power outages and by poor quality electricity incoming (range of fluctuation of voltage is 160-250 V). The current situation makes appeal to heat-powered pumpless absorption refrigeration units (ARU). Refrigeration units of ARU have a number of unique features such as: the possibility of use in a single ARU a number of different sources of heat – both electric and alternative (heat of combustion of fossil fuels and biogas, solar radiation, exhaust emissions of internal combustion engines); the ability to work with low-quality sources of energy, including electricity network in the voltage range of 160-250 V; noiselessness, high reliability and long service life.

The advantages of ARU should include the minimal price among existing types of small capacity refrigeration equipment, which in many cases determines their popularity among customers. Important in modern conditions is also the fact that the working fluid of ARU – water-ammonia solution with the addition of inert gas (hydrogen, helium or mixtures thereof) belongs to natural refrigerants and is therefore completely environmentally safe (has zero ozone-depleting potential and the potential of the "greenhouse" effect). One of the most effective developments is the universal low-temperature chamber (LTC) of the "chest" type series, including the vehicle type (installed on car trailers), with a useful volume: 100; 180; 220; 240; 280 dm^3. LTC's original design of the "chest" type is protected by Ukrainian patent No. 50941 and has two refrigeration units (on the sides or on the rear wall in

a row), designed to provide storage regimes in a wide temperature range – from minus 18°C (long term storage) to plus 10-12°C (short-term storage of fruits and vegetables). All the developments are made on the basis of modern serial industry technologies of Vasylkivsk refrigerators plant (VRP). Design features of “chest” help to preserve cooled air inside the chamber, so that when you open the lid from the room, the air with a high moisture content does not get on the heat-receiving panels. This can significantly reduce the rate of formation of snow coats and thereby improve the performance and power characteristics of LTC.

The implementation took place at the VRP. Achieved reducing energy consumption – up to 50%, enhanced functionality. To create a batch sample of absorption refrigerator with alternative energy sources, it is necessary to develop and produce the burner that works on, for example, liquefied gas, kerosene, diesel fuel, or gasoline. It is expedient to consider the use of biogas and gas generators.