

## DEVICE FOR THE MOISTURE CONDITION STUDY IN NON-HOMOGENEOUS MATERIALS

Ivanov<sup>1</sup> Serhii Oleksandrovysh, Hryshchenko<sup>1</sup> T.H., Burova<sup>2</sup> Z.A.

<sup>1</sup>*Institute of Engineering Thermophysics of NAS of Ukraine,*

*Maria Kapnist (Zhelyabova) str., 2a, 03057, Kyiv.*

*(098) 400-44-02; e-mail: [teplomer@ukr.net](mailto:teplomer@ukr.net)*

<sup>2</sup>*National University of Life and Environmental Sciences of Ukraine*

**Introduction.** The ratio of free and bound moisture is one of the important factors that must be taken into account when choosing the parameters of products storage and optimizing fuel consumption for drying raw materials. This problem is especially important for the food industry, where the researched raw materials are thermolabile and heterogeneous in structure. Their properties changes in time and under the elevated temperature, enzymatic and microbiological influences and so on. Due to the large number of influence factors the analytical calculation of the free and bound moisture ratio in such materials can lead to significant errors so the most expedient is an experimental study.

One of the most common methods of experimental study the moisture content of materials is the DSC-method, but modern DSC-devices are not suitable for the study of representative samples of non-uniform materials.

**The purpose of the work** is the development of recommendations for the specialized device design for studying moisture in heterogeneous materials and substantiating the basic provisions for its creation.

**Research results.** The analysis of methods and means of experimental determination of the moisture state in materials is carried out. Recommendations for the specialized calorimeter design for the study of non-uniform raw materials are formulated. The new calorimeter generalized concepts and their characteristic features such as the principle of operation and processing of data are presented. The design advantages and disadvantages are analyzed and tasks for further work are assigned.

**Conclusion.** The specialized device creation will allow the moisture condition analysis in non-homogeneous materials. The prospect using the calorimeter as part of the heat of evaporation and heat capacity determining system will provide the opportunity to obtain complete information for calculating the modes of rational drying and storage of the investigated material on the basis of experimental data that will be widely used in the food and chemical industry, pharmaceuticals, energy, construction industry etc.