# THE INVESTIGATION OF OPERATIONAL PARAMETERS OF THE OF GEOTHERMAL VENTILATION GROUND-COUPLED HEAT EXCHANGER OF ENERGY-EFFICIENT BUILDINGS

**M. Tkachenko, B. Basko, O. Nedbaylo, I. Bozhko, O. Tutova, M. Novitskaya**

*Institute of Technical Thermophysics of the National Academy of Sciences of Ukraine, st. Bulakhovsky, 2, Ukraine, +38 (044) 4242527*

*e-mail: basok@ittf.kiev.ua*

For the comfort people abidance in the buildings, the fresh air availability is one of the most important sanitary and hygienic conditions in the premises, which is ensured by the operation of the ventilation system.

The aim of the work is the investigation of the main thermal parameters of an air-ground heat exchangers (AGHE) of the geothermal ventilation system of an energy-efficient building.

A full-scale experimental stand was created at the Institute of Technical Thermophysics of the National Academy of Sciences of Ukraine to study thermal processes during the geothermal ventilation system operation. The experimental stand consists of the main parts:

1. Receiver of external air (which is located in protected from direct exposure of solar radiation area) 2. Air-ground heat exchanger of Π - shaped configuration (horizontal pipeline Ø110 mm from polyvinyl chloride) 43 m long linear, immersed in 2.5 m; 3. Axial fan Vents TT 200 for pumping air through the heat exchanger; 4. Measuring system: Testo 405-V1 hot-wire anemometer, BME280 semiconductor sensors recording temperature, relative humidity and atmospheric pressure with a secondary microprocessor-based device.

During the summer period, there are significant daily temperature drops of the outside air (up to 17 ° C) in the range of 14 ° C to 31 ° C, while it should be noted that the air temperature at the outlet from the CTP is within 18 ° C ± 0.5 ° C. In the cold period of the year, the outside air warms up in the AGHE and continue to flow into the heat exchanger of the air handling unit for reheating up to specified parameters.

Such parameters as the heat exchanger depth of placement, its geometrical dimensions and design, the temperature of the soil and air, the thermophysical characters of the soil and the the heat exchanger material i, the air flow through the system, as well as climate specifics featuresof the location.

Experimental studies demonstrate the geothermal ventilation system as an energy-saving technology. It is advisable to recommend such system in the case of energy-efficient construction and reconstruction of the existing both residential and public buildings.