

“PASSIVE HOUSE” – AN INNOVATIVE TECHNOLOGY IN CONSTRUCTION

Many modern innovations in construction are aimed at making human settlements less harmful for the environment. Examples of buildings which will allow us to live in harmony with the nature in the future without depriving of habitual comfort are so called ‘passive houses’. The passive house concept is a comprehensive approach to the economic, environmentally friendly and energy-saving construction of objects for different purposes. It consumes 85% less energy compared with conventional buildings; it is the leading standard in the world of building energy efficiency. Such house is opening a new era in building, anticipating future problems and offering reasonable solutions for today’s environmental problems.

Dr. Wolfgang Feist, the founder of the Institute of the Passive House in Darmstadt (Germany), and Professor Bo Adamson from Lund University in Sweden were the first to develop the design of a passive house in May, 1988. The concept was developed in numerous research projects funded by the German State of Hesse. Since the time the passive house technology was improved, over 2,000 buildings have been built on its basis in Western Europe.

The essential components of a passive house:

1. Exclusively high level of heat insulation.
2. Well insulated window frames with triple low-energy glass.
3. Construction is free of cold bridges.
4. Sealed membrane of a building.
5. Comfortable ventilation with high-efficient heat recovery.

A passive house must meet the following requirements: energy conservation system should minimize heat loss, and the need for heating should be so minimal to be achieved through a system of heat exchange ventilation. Passive houses are very comfortable and environmentally friendly to people. There are no ‘cold’ zones in them, and all rooms have the same comfortable temperature. Optimum temperature, humidity and air purity are maintained automatically. A passive house has stable and adjustable temperature, and the fresh, clean air is supplied continuously. Small heating is required only at low temperatures. Ideally, a passive house is an independent power system, which does not require the cost for maintaining the comfortable temperature of air and water. The basic principle for designing energy-efficient house is to use all means to save heat. Such house obtains heating due to the body heat of its residents, alternative heat sources (mostly solar panels), and household appliances. Due to a special layer of insulation of exterior walls, absence of cracks, special ventilation, it is possible to maintain a constant climate stable temperature conditions regardless of season. The functioning of a passive house is based on the use of automated control system of all technical installations, known as the ‘smart house’ system. It promotes convenience in everyday life as well as saving heat energy that is the most important for a passive house.

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