



ISSN: 2350-0328

**International Journal of Advanced Research in Science,  
Engineering and Technology**

**Vol. 7, Issue 5 , May 2020**

# **The Problems of Individual Heat Metering in Apartment Buildings**

**Kholiqova Irodakhon Karimovna , Abdug'aniev Numonjon Nabijonovich**

Department of Production of Construction Materials, Products and Constructions, Assistant of Fergana Polytechnic Institute, Ferghana, Uzbekistan

Department of Production of Construction Materials, Products and Constructions, Assistant of Fergana Polytechnic Institute, Ferghana, Uzbekistan

**KEYWORDS:** apartment, building envelope constructions, inter-apartment partitions, microclimate, temperature, automation, heat meter, thermal balance, energy conservation

**ABSTRACT:** Modern multi-apartment buildings (MAB) are usually equipped with individual meter and regulating facilities for the thermal energy used. Standards in effect in Russia allow for maintenance of inside air temperature within a wide range of permitted values. Heat transfer through inter-apartment partitions and walls become possible in case of a difference between temperatures of the inside air in adjacent apartments. This gives some grounds to refuse mandatory installation of individual (apartment) heat meters in the MAB. How can this problem be solved? We offer specific recommendations.

## **I. INTRODUCTION**

Modern apartment buildings (MCD), as a rule, are equipped with individual metering and regulation of consumed thermal energy. Operating on the territory of Russia the standards are used to maintain the indoor temperature of the internal air in a wide range of values. In the presence of the temperature difference between the internal air spaces of neighboring apartments become possible flows of heat through interroom overlappings and partitions. This gives some grounds for rejection of mandatory installation of individual (apartment) metering devices of thermal energy in the ICM. Kamagrasildenafil? Prealgebraquestions.html.

Key words: microclimate, automation, heat, apartment, building envelope, temperature, thermal balance of buildings, energy saving, interroom partitions

## **II. SIGNIFICANCE OF THE SYSTEM**

### **THE PROBLEMS OF INDIVIDUAL HEAT METERING IN APARTMENT BUILDINGS**

Modern apartment buildings (MCD), as a rule, are equipped with individual metering and regulation of consumed thermal energy. Operating on the territory of Russia the standards are used to maintain the indoor temperature of the internal air in a wide range of values. In the presence of the temperature difference between the internal air spaces of neighboring apartments become possible flows of heat through interroom overlappings and partitions. This gives some grounds for rejection of mandatory installation of individual (apartment) metering devices of thermal energy in the ICM. How can I solve this problem? We offer specific recommendations.

## **III. LITERATURE SURVEY**

With the adoption of legislative measures to promote energy conservation have intensified the work to improve the energy efficiency of capital construction objects. To reduce heat consumption in buildings, generally, there are two main groups of energy saving measures. The first group makes efforts to reduce heat energy losses through the building envelope: increase the heat resistance of outer walling, enhancing the tightness of the building envelope. The second group includes measures for the rational use of thermal energy, for example through automation and better management of temperature regimes in the building and a separate heated rooms. For this purpose active participation in the energy saving of the residents appropriate the installation of individual (apartment) of metering devices of thermal energy and devices for heating control.



Requirements for equipping the buildings with the metering devices used energy resources in the implementation of payments for energy resources are contained in article 13 of the Federal law № 261-ФЗ. In accordance with part 7 of this article, buildings, structures, constructions and other objects, in the process of operation which use energy resources, must be equipped with metering devices used energy resources. Apartment house, commissioned from 1 January 2012 after the implementation of construction, reconstruction, should be equipped with optional individual metering devices of thermal energy.

Problems of heat supply schemes with door-to-door bussing

The transition to modern energy saving circuit design with door-to-door installation of metering devices of thermal energy has identified a number of common problems:

- dissatisfaction with some tenants a lower quality of heating in the apartments, which can be a significant decrease in the neighboring apartment or individual rooms the temperature of indoor air (as a rule, this is achieved to reduce payment for heat energy during prolonged absence of tenants in the apartment or in separate rooms);
- poor visualization and insufficient awareness of residents about the possible and available to them energy-saving measures, regulatory restrictions, threshold minimum temperature for comfortable sleep and rest in the heated rooms, etc.;
- the desire of some tenants to move to housing the generators, as evidenced by including judicial practice. This contributes to the lack of individual metering devices of thermal energy, or low quality of public services (high cost of thermal energy failure to observe the required parameters of the coolant, a high accident rate, etc.).

On the pages of "AVOK" I discussed [1], in which experts have expressed different opinions concerning the specified problems and the advisability of leaving in force the requirement of the equipment of individual apartment houses (flats) metering devices of thermal energy (further – Problem). As it usually happens in discussion, the experts were divided into those who supported this requirement, and those who insist on the need for its exclusion from the current legislation as a mandatory requirement. The reasoning of supporters and opponents are presented in [2].

Confirmation of the relevance of the Problem

#### IV. EXPERIMENTAL RESULTS

Consider a specific example, the urgency of the Problem (see \*). Suppose that in the newly built and almost fully occupied MCD is flat, which is the minimum allowable for residential areas, the inside air temperature is 15 °C. In all the neighboring apartments that come in contact with this, supported higher inside air temperature is 20 °C.

When equipped all the apartments with individual metering devices of thermal energy can take place a situation in which individual tenants during the heating period while maintaining indoor temperatures of indoor air can partially or completely compensate for heat losses at the expense of neighbors in their apartments higher the inside air temperature. Whether the mandatory equipping of individual apartment houses (flats) metering devices of thermal energy?

Initial data for calculation we will take from the example presented in Appendix B recommendations R NP "ABOK" 2.3–20122:

Location – Moscow.

The estimated ambient air temperature -25 °C (according to SP 131.13330.2012)3.

The purpose of the building is residential, single-section, with a warm attic and unheated tehpodpole.

Number of entrances – 1.

Number of floors – 10.

We assume that the apartment in which are supported the minimum allowable values of temperature of internal air, corner, two bedroom and is located on the intermediate, for example, on the seventh floor (hereinafter – apartment X).

The apartment X will take area: the floor 85 m<sup>2</sup>, ceiling – 85 m<sup>2</sup>, internal separation walls separating the flat from the adjacent X, – 50,85 m<sup>2</sup>. A fragment of the plan of the apartment is presented in SP 131.13330.2012 in Fig. B. 1. Heat transfer resistance of external building envelopes:

- external walls - 3.31 m<sup>2</sup> • °C / W;
- windows and balcony doors - 0.56 m<sup>2</sup> • °C / W;
- blank part of balcony doors - 0.74 m<sup>2</sup> • °C / W.

Heat transfer resistance of internal building envelopes<sup>4</sup>, separating the premises of apartment X, in which the internal air temperature is maintained at 15 °C, from the rooms of neighboring apartments with an internal air temperature of 20 °C:



ISSN: 2350-0328

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- internal interroom partitions, consisting of reinforced concrete 200 mm thick and two plasterboard sheets (located on different sides of the partition), - 0.40 m<sup>2</sup> • ° C / W;
- floors (top and bottom), consisting of monolithic reinforced concrete with a thickness of 200 mm, screed and laminate flooring - 0.37 m<sup>2</sup> • ° C / W.

For other solutions to this problem, read the next issue of the journal "Energy Saving".

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ISSN: 2350-0328

**International Journal of Advanced Research in Science,  
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**Vol. 7, Issue 5 , May 2020**

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