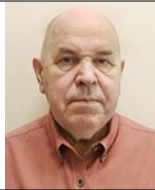


■ Lukinov V.A.

Classification of living conditions in housing accommodations

In this article the author analyzes the values of per-capita housing supply, the main parameters of living environments that describe their comfort, and the criteria of comfortable living in housing accommodations developed by the author. He has analyzed the current legislation and recommendations of non-governmental organizations concerning the classification of housing accommodations by the level of their comfort. The author has conducted comparative analyses of the main Russian and European parameters of energy consumption and thermal comfort in housing accommodations. The author has set guidelines to identify good living conditions: a comfortable housing accommodation and its location, norms of per-capita housing space, indoor climate (firstly, thermal comfort), availability and quality of infrastructure. The author believes that living conditions are good when the two components are in place: the availability of comfortable accommodation, utilities, social and transport infrastructure. He has formulated the definition of comfortability of living environments, comfortability of housing accommodations and comfortable living conditions as viewed by families and single residents. The author has developed the main criteria of comfortable living conditions for a family. According to the author, a family owns a comfortable accommodation or leases low-rent municipal accommodations; the accommodation has, at least, 18 m² for each family member who occupies one family room; the apartment has, at least, 2 bathrooms. The author believes that living conditions in single-family houses and apartment houses can be comfortable, uncomfortable and non-comfortable. The author lists 6 levels of living conditions for Russian residents and the criteria for this breakdown. This article supplements the method of integrated residential property management applied in our country.

Keywords: *living conditions, living environment, housing accommodations, comfortability of living environments and housing accommodations, apartment house, single-family house, housing per capita, criteria of comfort, discomfort and non-comfort of living conditions for a family or a single*



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Nowadays, the Russian Federation has a legal framework that regulates the compliance of development, construction and operation of buildings, renovation of urban areas with architectural and planning, physicochemical, ergonomic, engineering, sanitary and epidemiological parameters. However, there are no theories or practical recommendations for evaluating the living conditions of residents [1–3].

The author suggests that, firstly, the living conditions of a family or a single depend on the fact if the family is accommodated comfortably or less comfortably (in an apartment of an apartment house, in a single-family house); secondly, on the average floor area per person (preferably more than one room per person) and the indoor climate; thirdly, on the infrastructure.

The population resides in single-family or multi-family residential buildings suitable for permanent residence and having different levels of comfort. In accordance with building codes and regulations (codes of rules), a single-family residential building is a detached house consisting of a separate apartment (one residential autonomous unit), that has a set of premises intended for permanent, long-term or short-term residence (including seasonal, vacation, etc.) of a single and/or a family [4], and a residential apartment building that has two or more apartments, common areas and common engineering systems [5].

In some regions, attempts are made to develop comfortability criteria for living environments. For instance, Moscow has rules and regulations governing urban development. Subject to these regulations, all

Moscow districts and quarters are divided into 4 groups [6] based on their comfort level:

- comfortable;
- relatively comfortable;
- uncomfortable;
- maximally uncomfortable.

All Moscow accommodation units are divided into 2 categories:

- apartment houses and single-family houses of the 1st category. They include residential buildings with changeable minimum floor areas and unlimited maximal floor areas. The floor area varies from 30 to 50 m² per person in the houses belonging to the 1st category. In higher standard (more comfortable) residential buildings, the floor area exceeds 50 m² per person;
- residential buildings of the 2nd category include buildings whose floor area does not exceed 30 m² per person.

Moscow authorities have made an integrated evaluation of comfortability of urban areas (the living environment coupled with social and transport infrastructure). However, the comfortability is not the subject of evaluation.

For the purpose of advertising and selling, the Guild of Real Estate Agents of Russia has developed a classification of new buildings for the primary housing market that includes 4 groups of buildings based on the comfortability level: the economy class (now the standard class); the comfort class and the comfort plus; the business class, and the premium class (luxury residences) [7].

Some regulatory documents have definitions of technical, engineering and epidemiological parameters of housing accommodations. E.g., the engineering infrastructure of an apartment house is a set of constructions, systems, elements, power receivers, cables, pipes, devices and other equipment that is needed to ensure a safe and comfortable environment in an apartment house. Comfortable living conditions as a category of the epidemiological status are complied with when actual qualitative and quantitative parameters of public services, indoor climate and cleanliness comply with the requirements specified in the project design documentation. Apart from these notions, indoor climate is defined as a set of indoor climate conditions that affect the human body by combinations of temperature, humidity and air velocity [8].

The only applicable federal document, that is indirectly related to the official assessment of comfortability in living accommodations, is the RF Government Decree dated September 27, 2021 "Determining the energy efficiency class of apartment buildings" that identifies 9 energy efficiency classes of buildings from the top (A++) to the bottom (G) one and authorizes the design, development and construction of buildings, belonging to A and B energy efficiency classes [9].

Regulatory documents in effect have definitions, quantitative and qualitative characteristics of living accommodations and the comfortability of living environments. Nonetheless, the currently used method of residential property management has neither any terms, nor any definitions of comfortability of living accommodations that should take account of the residential area per person, infrastructure, technical and economic criteria characterizing the living conditions of families or single residents.

Comfortability means good living conditions in a living environment. The author believes that good living conditions represent a combination of the following two components:

- a family or a single holds a comfortable apartment or a house;
- residents of comfortable dwellings have access to utility, social and transport infrastructure.

A living environment has some buildings located in the same area, adjacent areas, non-residential buildings and engineering structures, roads and driveways, parks and public gardens that are part of utility, social and transport infrastructure. The living environment is considered to be comfortable when all standards of design, development and renovation are met. Hence, the comfortability of a living environment can be defined as good living conditions in residential houses in an urban district; they arouse a set of positive psychological and physiological sensations in humans [10].

The comfortability of living accommodations (a single-family house, an apartment in an apartment house) means compliance with the following regulatory technical, economic, architectural design and epidemiologic standards:

- engineering infrastructure (hot and cold water supply, water disposal, energy supply, HVAC, fire safety, etc.) that ensures good living conditions in apartment and single-family houses and provision of all necessary services to residents;
- good indoor climate in living accommodations;
- a spacious kitchen (the floor area of, at least, 10 m²), two bathrooms and a balcony;
- ceiling height above 2.75 m;
- preferably rectangular rooms and non-linear space design;
- car-free courtyard, a ground parking lot located, at least, 10 meters away from the house walls and entrance.

Living conditions for residents represent a set of numerous good conditions that are met simultaneously:

- good location of a single-family or an apartment house and its comfortability class;
- the floor area and ceiling height;
- comfortable indoor climate;
- high-quality utility services;
- high-quality public services and green curtilage;
- a car-free courtyard, a sufficient number of ground and underground parking lots;
- engineering, social and transport infrastructure.

Now the problem to be solved by real estate market players (developers, designers, owners of residential properties and management companies) is to ensure comfortable living for residents (families or singles). The most essential stage of this problem resolution is to develop the theoretical criteria of comfort and comfortability of living environments and living accommodations and to classify the comfortability levels.

The main parameters developed in Russia for a good indoor climate are stated below:

- the indoor temperature (16–28 °C);
- air ventilation (not less than 20 m³/h/pers.);
- the relative air humidity (25–60 %) [8].

Luxury and business class living accommodations have car-free courtyards, because they have closed and guarded curtilages and a sufficient number of parking lots. It is most likely that comfort class accommodations cannot meet these requirements as they have few parking lots and underground parking facilities. The problem of ground parking lots can be solved by building free municipal parking lots as it is done in most West European countries; another way is to oblige car owners to use paid ground parking lots and charge penalties for parking in yards. For now, this urban planning problem has not been solved and this is the reason why living conditions in comfort class accommodations are still relatively comfortable.

The author considers living conditions to be comfortable if the following criteria are met:

- 1) only one family lives in a house or in an apartment (a couple with or without kids);
- 2) a family (or a spouse) owns the accommodation or occupies it under a first-hand contract;
- 3) the floor area of an apartment is within average regional limits (from 18 to 28 m²/pers depending on the subject of the Russian Federation);
- 4) the number of rooms (Q) exceeds the number of family members (N), at least, by 1 (family) room, or $Q > N$;
- 5) an apartment has, at least, 2 bathrooms.

If criterion 4 or 5 (see above) or both of them are not met (e.g., $Q = N$ and only 1 bathroom is available), the level of comfortability must be considered relatively high for a family. If more than 3 criteria are not met, the living conditions must be classified as uncomfortable. If some constituents of the engineering infrastructure are missing in a single-family house or an apartment house (e.g., no water disposal or energy supply), the living conditions must be considered as non-comfortable.

The criteria of comfortability of a comfort class apartment house are the same for a single and a family, although the 5th criteria (see above) should not be taken into account. Moreover, the minimum acceptable kitchen floor area is 6 m² and more.

► Any person spends most of his life (more than 60 %) in living accommodations and the life expectancy depends, to a great extent, on living conditions. People spend most of their effort and earnings on buying (building) comfortable living accommodations.

As of the year beginning 2022, the RF population was 145.6 million, 42 million of families and 44.9 million of singles [11]. The area of the RF housing is about 4.0 billion m², including 69.5 million apartments (that have 151 million rooms) [12]. The average floor area of housing is 27.5 m² per person, and the average number of rooms is 1.04 per person, about 1.5 and 1.3 times less than in Europe (over 40 m²/pers. and 1.3 room/pers.). Nevertheless, this is not the most objective comparison as the share of the total area of living accommodations equipped with heating systems in Russia as of the year end 2020 was 87.5 % of 100 % [12]. In Europe, the majority of living accommodations doesn't have heating systems (except for Scandinavian countries) and that's why living conditions in Europe cannot be considered comfortable in winter. Directive 2010/31/EU on the energy performance of buildings is in effect in the EU countries. This Directive has recommendations on reducing the energy consumption of existing buildings and buildings under construction as of 2021 closer to zero [13]. Moreover, the EN 16798 standard sets the essential parameters of indoor thermal comfort:

- min and max indoor air temperatures (from 16 °C in the winter season and up to 28 °C in summer);
- relative air humidity in the existing buildings shall vary from 20 to 70 %, and in the new buildings — from 25 to 60 %;
- air ventilation from 0.15 to 0.21 m/sec in the winter season and up to 0.40 m/sec in summer;
- indoor air quality, e.g., average CO₂ concentration in existing buildings shall be 800 ppm, in new buildings — 500 ppm [14].

It is worth emphasizing that the Russian and European norms describing the main parameters of indoor thermal comfort are nearly the same. However, EU countries are far ahead of the Russian

Federation in terms of the design and construction of new buildings whose energy consumption is closer to zero.

The total floor area of living accommodations equipped with all types of engineering systems in the beginning of 2021 was 2.73 billion m² that reaches 69.5 % of total living accommodations in the country [15]. This means that the ratio of comfortable living accommodations in Russia does not exceed 69.5 % and the ratio of non-comfortable accommodations is below 30.5 %. Rural population and some urban residents, residing in single-family and apartment houses, built more than 65 years ago, live in non-comfortable accommodations. It is noteworthy that about 13.2 % of all urban residents have apartments in apartment houses and comfortable all-season single-family houses [11].

The surveys made by the author allowed identifying the main criteria for evaluating and classifying comfortability in living accommodations:

- super-comfortable;
- highly comfortable;
- comfortable;
- relatively comfortable;
- discomfortable;
- non-comfortable (see Table).

Super-comfortable living conditions are typical for the richest families of the Russian Federation who bought mansions (3-storied villas), having the total floor area of over 250 m², and/or luxury apartments in premium class apartment houses, or luxury accommodations. The housing floor area per person exceeds 50 m², and this value exceeds the European standard.

In Russia highly comfortable living conditions are similar to the European norms of housing per person (more than 40 m²) when each family member has a separate room and some extra rooms (family rooms). Highly comfortable living conditions of wealthy families and citizens are typical for townhouse villages, premium and business class apartment houses that have high quality living environments.

Criteria of comfortability of living accommodations

Number	The comfort class of a house or an apartment house	The number of rooms (Q) in a single-family or an apartment house and the number of residents (N)	The floor area per resident, m ² /pers.	Energy efficiency class	Availability		Comfortability class
					Underground parking	Ground parking	
1	A single-family house having the floor area of over 250 m ² , a premium class apartment house	$Q = N + 3$ and more	More than 50	A++, A+, A, B	+	+	Super-comfortable
2	A single-family house having the floor area of 161–250 m ² , a business class apartment house	$Q = N + 2, 3$	More than 40 up to 50	A+, A, B	+	+	Highly comfortable
3	A single-family house having the floor area of 80–160 m ² , a comfort+ class apartment house	$Q = N + 1$	More than 28 up to 40	A, B, C, D	+/-	+/-	Comfortable
4	A single-family house having the floor area of less than 80 m ² , a comfort class apartment house	$Q = N$	More than 18 up to 28	B, C, D	–	+/-	Relatively comfortable
5	A standard class apartment house	$Q = N - 1, 2, 3$	Less than 18	B, C, D, E	–	+/-	Discomfortable
6	Accommodations in which some basic amenities are unavailable	$Q = N + 1, Q = N, Q = N - 1, Q = N - 2, 3$	Not regulated	D, E, F, G	–	+/-	Non-comfortable

Comfortable living conditions are typical for families and singles. They mean that one family member has 28–40 m² of accommodation space, and this value exceeds the average figures in Russia but does not reach the same figures in Europe. Such accommodations have, at least, two bathrooms, one room for each family member and one extra room (a family room). The drawback of Comfort Plus apartments is the lack of parking lots (normally one parking lot for 2 apartments).

Relatively comfortable conditions mean that one family member has 18–28 m² in an apartment, one room for each family member, and, at least, one bathroom. In Russia, most residents live in such apartments, as the average housing area per dweller varies from 18 to 28 m² in most regions of the country (e.g., in Moscow the housing area per dweller is 20.2 m², while 28 m² is average housing area per dweller in Russia). The housing space in a first-hand contract is 18–22 m² for each family member in most Russian regions [16].

Discomfortable living conditions are typical for families residing in small comfortable accommodations in which each family member has less than 18 m² or two families share an apartment/a house (an estimated quarter of all families in Russia share their accommodation with their parents) or rent their housing.

Non-comfortable living conditions mean:

- non-comfortable living accommodations (not equipped with necessary engineering systems, e.g., water disposal, etc.);
- rooms in shared flats, apartments and dormitories;
- unsafe houses;
- accommodations whose physical depreciation exceeds 60 %.

The notions and criteria of living conditions, developed by the author, supplement the integrated methodology of residential property management. The new theory serves as the basis for further research on real estate management and enables researchers and practitioners to classify the living conditions of Russian residents in a more substantiated way.

Классификация условий проживания населения в жилых помещениях

В статье проанализированы показатели обеспеченности населения жильем, основные параметры жилой среды, отражающие ее комфортность, и разработаны критерии комфортабельности условий проживания населения в жилых помещениях. Рассмотрены действующие законодательные документы и рекомендации общественных организаций о классификации уровней комфортности жилых помещений. Проведен сравнительный анализ российских и европейских основных показателей, отражающих энергопотребление и тепловой комфорт для проживания населения. Автором разработаны основополагающие принципы, характеризующие благоприятные условия проживания населения: комфортность жилого помещения и его местоположение, нормативы обеспеченности каждого члена семьи комнатами и общей площадью квартиры (индивидуального жилого дома), состояние микроклимата в жилом помещении (в первую очередь теплового комфорта), наличие и качество функционирования инфраструктуры на окружающей жилой территории (в микрорайоне или квартале). Автор считает, что комфортабельные условия проживания населения достигимы при одновременном функционировании двух главных составляющих жилой среды: наличия комфортного жилого помещения и необходимой инфраструктуры (инженерной, социальной и транспортной). Сформулированы авторские определения комфортности жилой среды, жилого помещения и комфортабельных условий проживания семьи, одиноко проживающего человека. Автором разработаны основные критерии, отражающие комфортабельные условия проживания семьи. К ним относятся: проживание семьи в собствен-

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ном комфортном жилом помещении (или по договору социального найма), обеспеченность каждого члена семьи общей площадью квартиры (дома) в размере не менее 18 м² и одной комнатой и, хотя бы, еще одной общей комнатой, наличие в жилом помещении, как минимум, двух санузлов. Автором проведена классификация условий проживания населения в жилых помещениях (индивидуальных (одноквартирных) жилых домах и в квартирах многоквартирных домов), которые могут быть комфортабельными, дискомфортабельными и некомфортабельными. Всего в статье выделено шесть уровней условий проживания российских граждан в жилых помещениях и приведены критерии, в соответствии с которыми рекомендуется определять класс комфортабельности проживания семьи или одиноко проживающего человека. Положения данной статьи дополняют методологию комплексного управления жилищным фондом страны.

Ключевые слова: условия проживания населения, жилая среда, жилые помещения, комфортность жилой среды и жилых помещений, многоквартирный дом, индивидуальный (одноквартирный) жилой дом, обеспеченность одного человека общей площадью жилого помещения (комнатами), критерии комфортабельности, дискомфортабельности и некомфортабельности условий проживания семьи (человека)

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