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ON AMENDMENTS TO THE REGULATIONS 30.13330.2016, «INTERNAL WATER PIPELINE AND SEWERAGE OF BUILDINGS. ACTUALIZED EDITION OF CONSTRUCTION STANDARDS AND REGULATIONS 2.04.01-85»

The article is devoted to the practical implementation of the results of the analysis of the relationship between the system of technical regulation in construction and the regulatory regulation of relations for the provision of public services. Changes in the current normative documentation in the sphere of water supply of apartment buildings are considered. It is shown that it is necessary to improve the methodological basis for designing in-house systems of cold and hot water supply in an apartment building and to create a legitimate methodological tool. Recommendations for improving the regulations 30.13330.2016, «internal water pipeline and sewerage of buildings. Actualized edition of construction standards and regulations 2.04.01-85» are proposed. Changes in the Construction Regulations 30.13330.2016 and the results of their expertise are given.

Keywords: *methodological support, regulations, internal water supply system, apartment building*

The current requirements of regulatory documents for internal centralized utility and drinking water systems for multi-unit apartment buildings (MAB), are set forth in the federal law "Urban Planning Code of the Russian Federation" (No. 190-FZ dated December 29, 2004), and are not fully implemented in regulatory and technical documents. In particular, the requirement of cl. 24 of Art. 1, which established the functional purpose of the water supply network as part of the communal infrastructure system. It also established the requirement of cl. 10 of Art. 55.24 of the Urban Planning Code, according to which the operation of MAB must be implemented, considering the requirements of housing legislation are not specified in the set of rules 30.13330.2016 "House water plumbing and sewerage of buildings. Updated revision of SNiP 2.04.01-85*" (SP 30.13330.2016). The change in the functional purpose of the water supply network is also confirmed by cl. 5 of Art. 2 of the Federal Law "On Water Supply and Wastewater Disposal" (No. 416-FZ of December 7, 2011). This omission

Статья посвящена практической реализации результатов анализа взаимосвязи системы технического регулирования в строительстве и нормативному регулированию отношений по предоставлению коммунальных услуг. Рассмотрены изменения в текущей нормативной документации в сфере водоснабжения многоквартирных домов. Показана необходимость совершенствования методологических основ проектирования внутридомовых систем холодного и горячего водоснабжения многоквартирного дома и создания легитимного методического инструментария. Разработаны рекомендации по совершенствованию свода правил 30.13330.2016 «Внутренний водопровод и канализация зданий. Актуализированная редакция СНиП 2.04.01-85». Приведены изменения в СП 30.13330.2016 и результаты их экспертизы.*

Ключевые слова: *методическое обеспечение, свод правил, внутренняя система водоснабжения, многоквартирный дом*

in the regulatory and technical documentation will not enable the performance of an unambiguous assessment of the compliance of the design solutions for the internal drinking water supply systems of the MABs, in accordance with the recommendations of SP 30.13330.2016, along with the mandatory requirements of the federal law "Technical Regulations on the Safety of Buildings and Structures" (No. 384-FZ of December 30, 2009).

In this regard, the development of a legitimate methodological toolkit, namely changes in SP 30.13330.2016, is a timely and urgent task.

Analysis of regulatory principles, regulatory requirements, and recommendations of regulatory and technical documents in the field of water supply for MABs. The results of the analysis of the principles of regulation, regulatory requirements, as well as recommendations of regulatory and technical documents in the field of water supply for MABs, are presented in [1].

The development of amendments to set of rules for the design of internal cold and hot water piping systems in MABs (under construction

and reconstruction) aimed to implement the requirements of the Federal Law No. 384-FZ to ensure safe living conditions for human health and their stay in MAB.

The tasks of developing a draft amendment to SP 30.13330.2016 are as follows:

Task 1: Take into account the requirements in the current regulatory documents regarding the operation of MABs in SP 30.13330.2016;

Task 2: Clarify the provisions for the design of internal water supply systems for MABs, specifically in terms of considering the requirements for the formation of methodological support for activities that regulate the functioning of the communal infrastructure system.

The legal basis for the analysis of SP 30.13330.2016 was the norms of the federal law "On technical regulation" (No. 184-FZ of December 27, 2002), which establish general principles for the formation of mandatory requirements regarding the subject of regulation. The norms of federal laws No. 190-FZ and No. 416-FZ indicate that the internal utility and drinking water system of MABs, which belong to two areas of regulation. Therefore, the technical regulation system should be interconnected and coordinated with the system of regulation for relations, for the provision of utilities and services to consumers. At the same time, the interconnection of systems should be ensured through the subordination of the requirements for technical regulations, on the safety of buildings and structures, and the requirements of housing legislation based on a unified approach to assessing the provision of safe functioning for the subject of regulation.

With regard to the design processes of internal utility and drinking water systems in MABs, the main regulatory documents are the federal laws: "Urban Planning Code of the Russian Federation," "Technical Regulations on the Safety of Buildings and Structures," and "On Water Supply and Wastewater Disposal."

The main regulatory documents, in relation to the design processes of internal utility and drinking water systems in MABs, are the codes of rules SP 30.13330.2016 and SP 31.13330.2012 "SNiP 2.04.02-84*. Water supply. External networks and facilities." The updated revision of SNiP 2.04.02-84* is approved by order of the Ministry of Regional Development of the Russian Federation No. 635/14 of December 29, 2011.

The main sources of housing law (housing legislation) are: "The Constitution of the Russian Federation" (adopted by popular vote on December 12, 1993); "Housing Code of the Russian Federation" (No. 188-FZ of December 29, 2004); "Urban Planning Code of the Russian Federation;" "Civil Code of the Russian Federation" (No. 51-

FZ dated November 29, 1994), and other legal documents. With that, from the point of view of the hierarchy of legal norms, the norms of Federal Law No. 188-FZ (part 8, article 8) have priority over the norms of laws and other legal acts in the field of housing legislation [2].

The standards and norms for the provision of housing and communal services, provided in quantitative terms, are established by the federal executive body, by the Decree of the Government of the Russian Federation (DG RF). These main regulatory documents are as follows:

- "On approval of the Rules for the establishment and determination of standards for the consumption of housing services and standards for the consumption of utilities for the maintenance of common property in a multi-unit apartment building" (DG RF No. 306 of 05.23.2006);

- "On approval of the Rules for the maintenance of common property in a multi-unit apartment building and the Rules for changing the amount of payment for the maintenance of residential premises in the event of the provision of services and work on the management, maintenance and repair of common property in a multi-unit apartment building of inadequate quality and (or) with interruptions exceeding the duration established" (DG RF No. 491 of 08.013.2006);

- "Rules for the provision of housing services to owners and users of premises in MAB and residential buildings" (DG RF No. 354 of May 6, 2011);

- "On the rules that are binding upon the conclusion of contracts for the supply of communal resources" (DG RF No. 124 of February 14, 2012);

- "On approval of the rules for cold water supply and wastewater disposal and on amendments to some acts of the Government of the Russian Federation" (DG RF No. 644 of July 29, 2013);

- GOST R 51617-2014 "Services of housing and utilities infrastructure and management of MAB. Utilities. General requirements" (Order of the Federal Agency for Technical Regulation and Metrology of June 11, 2014, No. 544-st);

- GOST R 56501-2015 "Services of housing and utilities infrastructure and management of MAB. Maintenance services for intra-building systems of heat supply, heating, and hot water supply of MAB. General requirements" (Order of the Federal Agency for Technical Regulation and Metrology dated June 30, 2015, No. 823-st);

- GOST R 56533-2015 "Services of housing and utilities infrastructure and management of MAB. Services for the maintenance of intra-building cold water supply systems for MAB. General requirements" (Order of the Federal Agency for Technical Regulation and Metrology dated July 29, 2015 No. 1003-st).

The following table presents the basic requirements for methodological support regarding the technical regulation system, and activities that regulate the communal infrastructure system functioning.

Analysis of the basic requirements for the creation of methodological support, in terms of utility and drinking water systems for MABs, enables an unambiguous conclusion about the common aim of providing public services and implementing the requirements of Federal Law No. 384-FZ, to ensure conditions in buildings and structures safe for human health and living. Therefore, the design methodology for utility and drinking water systems in MABs should consider the new parameters of hydraulic laws that characterize the aspects of activities for the provision of utility services, especially the requirements for the availability of services and saturation of consumption. At the same time, the main parameter in the design of water supply systems is water consumption, and meeting the requirements for the availability of services and saturation of consumption, during design, is achieved through the following:

- The choice of parameters for the internal water supply systems of the MABs, which ensure the possibility of transporting the utility resource at any time when the utility services are required;
- Selection of pipe diameters and equipment standard sizes based on the maximum (peak) utility consumptions;
- Determination of the values of the marginal consumptions of a utility resource, based on the standards of their consumption;
- The establishment of boundaries, both between the centralized and intra-building sections, and between the intra-building and intra-apartment segments of the MAB water supply system;
- The separate determination of the values of the marginal consumptions in residential premises, as well as the values of consumptions for general housing needs, and when using land plots based on the corresponding standards for the consumption of housing services or utility resources, according to the corresponding models of water consumption;
- Determination of the values of the calculated (integral) consumptions in individual

Basic requirements for methodological support

Technical regulation system in the field of construction	Utilities infrastructure regulation system
<ol style="list-style-type: none"> 1. Water supply is a regulated activity aimed at protection of health and improvement of the quality of life of the population by ensuring uninterrupted and high-quality water supply using centralized and non-centralized cold and hot water supply systems. 2. The provision of sanitary and epidemiological standards is ensured by the installation of water supply and sewerage systems in the MABs. 3. Safe conditions for human health and living in a MAB are ensured by the compliance of drinking water quality with hygienic standards. 4. The required quality of drinking water is ensured during operation by supplying the required amount of water and preventing its pollution. 5. The energy efficiency of water supply systems for MABs during their operation is ensured by the elimination of irrational consumptions and through the rational use of energy resources. 	<ol style="list-style-type: none"> 1. Water supply is a regulated activity that ensures safe living and staying conditions in a MAB. 2. A utility water supply service is the activity of supplying consumers with a communal resource (water) to the MABs in accordance with consumption standards. 3. The consumption standards are established regardless of the presence of metering devices in the MABs. 4. Standards of consumption are determined per month of consumption of a utility resource. 5. Requirement for the availability of services implies that utility water supply services should be provided continuously or at intervals not exceeding the duration that meets the requirements for the quality of utility services. 6. Requirement for saturation of consumption implies the provision of utility services of guaranteed quality. 7. The design of the internal water supply systems of MABs and their parameters should ensure the possibility of transporting utilities and consuming utilities of guaranteed quality. 8. The utility resource and the utility service are provided based on contracts between the resource supplying organization, the service provider and the consumer, or between the resource supplying organization and the consumer.

sections of the water supply system, considering the differentiation in the time of day for the consumption of housing services, and utility resources by various consumers.

Amendments to the SP 30.13330.2016. The following amendments should be made to the SP.

The *Introduction* section should be supplemented with a paragraph providing information about the authors of the amendments.

The Regulatory section references should be supplemented with a list of national standards GOST R included in the series "Services of housing and communal services and management of apartment buildings." GOST R 51617-2014 "Services of housing and communal services and management of apartment buildings. Utilities. General requirements," and GOST R 56501-2015 "Services of housing and communal services and management of apartment buildings. Maintenance services for intra-building systems of heat supply, heating, and hot water supply of apartment buildings. General requirements;" GOST R 56533-2015 "Services of housing and communal services and management of apartment buildings. Services for the maintenance of intra-building cold water supply systems for apartment buildings. General requirements".

In Subsection 3.2, the table should be supplemented with the following designations: Subsection 3.1 should be supplemented with the terms and definitions contained in the national GOST R standards included in the series "Services of housing and communal services and management of apartment buildings": an intra-building hot water supply system for apartment buildings (a set of distribution pipelines, drop pipes, including locking devices, technologically interconnected devices for metering, automation, control and regulation); an intra-building cold water supply system for apartment buildings (a set of pipelines, devices, machinery and equipment connected technologically to each other and to the water supply network, providing the utility resource supplied, its accounting, adjustment, if necessary, and supply to places of direct consumption); utilities (the contractor's activities to supply consumers with any communal resource separately or two or more of them in any combination in order to ensure favorable and safe conditions for the use of residential, non-residential premises, common property in a multi-unit apartment building, as well as land plots and residential buildings (households) located on them); utilities (cold water, hot water, electricity, gas, heat energy, heat carrying agent in the form of hot water in open heat supply systems (hot water supply), household fuel gas, solid fuel in the presence of stove heating, used to provide

public services and consumed when maintaining common property in a multi-unit apartment building); and introduced for the first time: "specifying input to the residential premises" (the input node into the residential premises located the highest and farthest from the point of connection of the intra-building water supply system to the centralized network with the maximum value of the limiting consumption and the required free pressure); "utility service of guaranteed quality" (activities for the supply of cold and hot water to consumers in apartment buildings not lower than those established by Decree of the Government of the Russian Federation No. 354 of May 6, 2011); "limiting consumption" (calculated consumption in the section of the internal utility and drinking water system of a multi-unit apartment building, corresponding to the peak consumption of communal resources based on their standards consumption):

$Q_{u,m}^c$ – the amount of cold water consumption by one person on an average day, $m^3/(\text{day} \cdot \text{person})$;

$Q_{u,m}^h$ – the amount of hot water consumption by one person on an average day, $m^3/(\text{day} \cdot \text{person})$;

$Q_{u,max}^c$ – the value of the maximum daily consumption of cold water by one person, $m^3/(\text{day} \cdot \text{person})$;

$Q_{u,max}^h$ – the value of the maximum daily consumption of hot water by one person, $m^3/(\text{day} \cdot \text{person})$;

$K_{dl,max}$ – the coefficient of maximum daily unevenness of water consumption;

Q_U^c – the value of the maximum daily consumption of cold water for one residential premises, $m^3/(\text{day})$;

Q_U^h – the value of the maximum daily hot water consumption for one residential premises, $m^3/(\text{day})$;

$q_{T,U}^c$ – the average hourly consumption of cold water for one residential premises, l/h ;

$q_{T,U}^h$ – the average hourly consumption of hot water for one residential premises, l/h ;

$K_{hr,max}^c$ – the coefficient of the maximum hourly unevenness of cold water consumption, based on the number of sanitary appliances installed in one residential premises;

$K_{hr,max}^h$ – the coefficient of maximum hourly irregularity of hot water consumption, based on the number of sanitary appliances installed in one residential premises;

$q_{hr,U}^c$ – the value of the maximum hourly consumption of cold water for one residential premises, l/h ;

$q_{hr,U}^h$ – the value of the maximum hourly consumption of hot water for one residential premises, l/h ;

$q^{lim,c}$ – the value of the limiting consumption of cold water per second for one residential premises, l/s ;

$q^{lim,h}$ – the value of the limiting consumption of hot water per second for one residential premises, l/s.

The Water supply section should be supplemented with paragraphs that consider the requirements for the design and calculation of water supply systems for MAB, which are contained in the standards and norms of housing and utilities:

5.2.1.3. The systems of cold and hot water supply of MAB must ensure the possibility of transporting a utility resource at any time, when utility services of guaranteed quality are required;

5.2.1.4. Calculated (marginal) water consumption in cold and hot water supply systems for MAB should be determined based on the standards for the consumption of utilities and services;

5.2.2.9. The pipe diameters and standard sizes of equipment for cold and hot water supply systems in MAB are chosen based on the values of peak (marginal) consumptions of utility resources, according to the methodology given in Appendix G;

5.2.2.10. Peak consumptions in residential premises, as well as consumptions for common-house needs, and for the use of land plots, are determined separately based on the corresponding standards for the consumption of communal resources or services for the corresponding water consumption patterns;

5.2.2.11. The value of the calculated (integral) consumption in individual sections of the water supply system of a multi-unit apartment building is determined by considering the differentiation in the time of day for the consumption of utilities and services by different consumers;

5.4.17. Cold water supply networks in MAB should be designed by considering the requirements of 5.2.1.3;

5.5.6. Hot water supply networks for MAB should be designed by considering the requirements of 5.2.1.3.

SP 30.13330.2016 shall be supplemented with Appendix G, which comprises the methodology for determining the calculated (marginal) consumption of cold and hot water in centralized utility and drinking water systems for MAB.

Appendix G. 1. Methodology for determining the calculated (marginal) consumptions of cold and hot water in centralized utility and drinking water systems of a multi-unit apartment building at the inlet to a residential building. The calculated (marginal) water consumption is determined based on the initial data, namely standards for consumption of cold (c) and hot (h) water in residential premises $N_w^{c(h)}$, $m^3/(\text{month} \cdot \text{person})$; total area of the apartment S_{tot} , m^2 ; the norm for the provision of living space S_{nor} , m^2 , or the number of consumers of utilities in a residential unit U ,

people; number of sanitary appliances installed in apartment N , pcs.

The calculation is performed as follows:

- The total amount of water consumption by one person on an average day is determined:

$$Q_{u,m}^{c(h)} = \frac{N_w^{c(h)}}{28}, m^3/\text{day} \cdot \text{people}; \quad (1)$$

where 28 is the minimum number of days in February;

- The number of residents in an apartment is determined (in the absence of data on the number of consumers of utilities in a residential unit):

$$U = \frac{S_{tot}}{S_{nor}}, \text{people}; \quad (2)$$

- The total value of the maximum daily water consumption by one person is determined:

$$Q_{u,max}^{c(h)} = Q_{u,m}^{c(h)} \cdot K_{dl,max}, m^3/(\text{day} \cdot \text{people}); \quad (3)$$

where $K_{dl,max}$ is the coefficient of the maximum daily irregularity of water consumption, which should be determined according to SP 31.13330.2012 "SNIIP 2.04.02 - 84 *. Water supply. External networks and facilities." Updated edition of SNIIP 2.04.02 - 84*:

- The total value of the maximum daily water consumption for one residential premises is determined:

$$Q_U^{c(h)} = Q_u^{c(h)} \cdot U, m^3/\text{day}; \quad (4)$$

- The total value of the average hourly water consumption for one residential premises is determined:

$$q_{T,U}^{c(h)} = 1000 \cdot \frac{Q_U^{c(h)}}{24}, l/h; \quad (5)$$

- The value of the coefficient of the maximum hourly unevenness of water consumption, based on the number of sanitary appliances installed in one residential premises $K_{hr,max}^c$ ($K_{hr,max}^h$) is determined by Table B.1 and cl. 5.2.2 SP 30.13330.2016 "House water plumbing and sewerage of buildings. Updated revision of SNIIP 2.04.01-85*:"

- The total value of the maximum hourly consumption for one residential premises is determined:

$$q_{hr,U}^{c(h)} = q_{T,U}^{c(h)} \cdot K_{hr,max}^{c(h)}, l/h; \quad (6)$$

- The total value of the limiting consumption per second for one residential premises is determined:

$$q^{lim,c(h)} = \frac{q_{hr,U}^{c(h)}}{3600} \text{ l/s.} \quad (7)$$

The marginal consumptions calculated according to the Eqs. (1)–(7) are used as initial data for the hydraulic calculation of intra-building water supply systems, and the selection of in-apartment equipment.

2. Methodology for determining the calculated (marginal) consumptions of cold and hot water in centralized utility and drinking water systems of a multi-unit apartment building in sections of intra-building water supply systems. The calculated (marginal) water consumption in individual sections of intra-building utility and drinking water systems is determined in the same way as the calculated (marginal) consumption of cold and hot water in centralized utility and drinking water systems of a multi-unit apartment building (at the inlet to a residential building). The difference in the calculation consists of the choice in the number of consumers of utilities in residential premises U , people, and the number of sanitary appliances installed in residential premises N , pcs., in the previous sections of the intra-building water supply system.

When determining the marginal water consumption for a multi-unit apartment building, the initial data for the calculation is the total number of consumers of utilities in the residential premises of MABs U , people, and the total number of sanitary appliances installed in residential premises of MABs N , pcs.

If the time of day coincides in the consumption of utilities and services for household and drinking needs, general household needs, and when using land plots, the integral calculated (marginal) consumptions represent their sum.

The References section should be supplemented with a list of federal laws, namely Urban Planning Code of the Russian Federation, Housing Code of the Russian Federation, and the Civil Code of the Russian Federation.

Examination of changes in SP 30.13330.2016. Proposals for amending SP 30.13330.2016 considered by the Subcommittee on Engineering Systems of Buildings and Structures of the Committee for Structural, Engineering and Technological Systems of the National Association of Surveyors and Designers, were approved, and sent to the Design Directorate of the Ministry of Construction and Housing and Communal Services of the Russian Federation for accounting, when updating SP 30.13330.2016.

Conclusions

1. The methodology for designing water supply systems for MABs should include the basic requirements for the formation of methodological support designated for activities that regulate the functioning of the communal infrastructure system.

2. Changes to the text of SP 30.13330.2016 will enable clarification to its content, and the elaborate individual elements of the design and calculation of internal water supply systems for MAB.

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