

PERSPECTIVES ON PRESSURE MANAGEMENT IN THE WATER SUPPLY SYSTEM OF A PRIVATE HOUSE

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Abstract

What should be the water pressure at the site with an artesian well refers to the intensity of water pressure. A very important parameter that affects not only the comfort of living in the house, but also the technical condition of the pumping device, as well as sanitary appliances. Regular monitoring with the use of pressure gauges will help to make sure that the values are normal and, if necessary, adjust them. Recommended values are specified in GOST and other technological standards. This article summarizes the main solutions to the problems of emergency situation due to differential pressure in private homes.

Keywords: technical atmosphere, water flow, water supply, household appliances, water network, working pressure, conventional fittings.

Introduction

In order to regulate the pressure, it is necessary first of all to know what the water pressure in the house should be. To measure this indicator, two values are used - bar, as well as technical atmosphere, the actual difference between which is not large. The current SNiPs determine the following norms.

- Cold water - 0.3-6 bar.
- Hot water - 0.3-4.5 bar.

As for the second value, the indicator of one technical atmosphere indicates that the water flow comes to a height of about 10 metres (the same as for one bar). If we talk about centralised water supply in urban multi-storey houses, then here in most cases the pressure from 4 to 4.5 bar is maintained, which is quite sufficient for the needs of all residents. In turn, the borehole water supply of a private house or cottage will require independent calculations, which can be quite difficult to cope with without the help of specialists[1-8].

When designing a future water supply system, first of all you need to decide which sanitary and household appliances you plan to use. Here are the normative values for the most common types of equipment.

- Washing machine - 2 bars.
- Faucets, shower installation - 1.5 bar.
- Jacuzzi bathtub - 4 bar.
- Automated watering of lawns, garden or vegetable garden - up to 5 bar.

Thus, a working pressure of 4 bar will be sufficient for optimal operation of most appliances. In this case, the most important condition will be the use of quality valves, regulating and shut-off



valves. Keep in mind: if you plan to organise an autonomous water supply from a fountaining well, welded connections should be used when installing the main line. Taking into account that water pressure in such sources often reaches 10 bar, ordinary fittings may simply fail to cope with the loads and fail.

Measurements made. To measure the pressure in the water supply system, a special device - a pressure gauge - is used, which is mounted next to the water meter at the water pipe entrance to the building. If the house is equipped with an individual heating system, the heating boiler must also be equipped with a pressure gauge. With the help of such measuring equipment, you can independently monitor the actual values, comparing them with the norm of water supply pressure in a private house. The recommended values are specified in GOST and other technological norms.

Having installed a pressure gauge, its readings should be monitored regularly. This will allow you to timely identify and prevent serious problems that cause deviations from the norms. In particular, low pressure in the water supply system of a private house does not allow you to get sufficient pressure. This problem is especially acute if an individual gas boiler is used for heating. In turn, exceeding the norm can lead to breakdowns of sanitary and household appliances connected to the water supply system. Increased pressure provokes leaks at the connecting sections of the pipeline, as well as the failure of fragile sensitive elements of the engineering network [9-14].

There are several reasons why the water pressure in the water supply system deviates from normal. One common problem is wear and tear on the pipes. If the water supply system serves long enough, and the homeowner neglects routine maintenance and repair, negative consequences are inevitable. Not the best way to the condition of the pipes affects too hard water, from constant contact with which sooner or later formed lime scale. In case of visible damage to the pipe walls, the only solution is to replace them - there is no other solution to the problem.

Among other reasons why the water pressure in a private house is disturbed, we can mention the following points.

- Insufficient flow rate (natural filling) of an artesian well. Often such a problem is the result of incorrect engineering calculations during design and drilling. If the liquid for any reason leaves the source, the pressure in the main line invariably drops.

- Incorrect selection, as well as wear and breakage of pumping equipment. Errors made during the design of the pressure installation. If the pump is selected incorrectly (that is, its power does not correspond to the daily norm of water consumption), in the network is constantly maintained increased pressure. As a consequence, the autonomous water supply system gradually wears out, and there are inevitable leaks in the pipeline in such cases.

- Incorrect calculation of water consumers at the design stage. If too many household appliances and water intake points are connected to the main network, the pressure drops and, consequently, the pressure in the main line decreases.

For this reason, it is very important to calculate correctly the number of water consumers that can be used at the same time. In addition, clogging of underground pumping stations, leaking pipe joints, and improper installation of sanitary fittings are often responsible for the reduction [15-21].



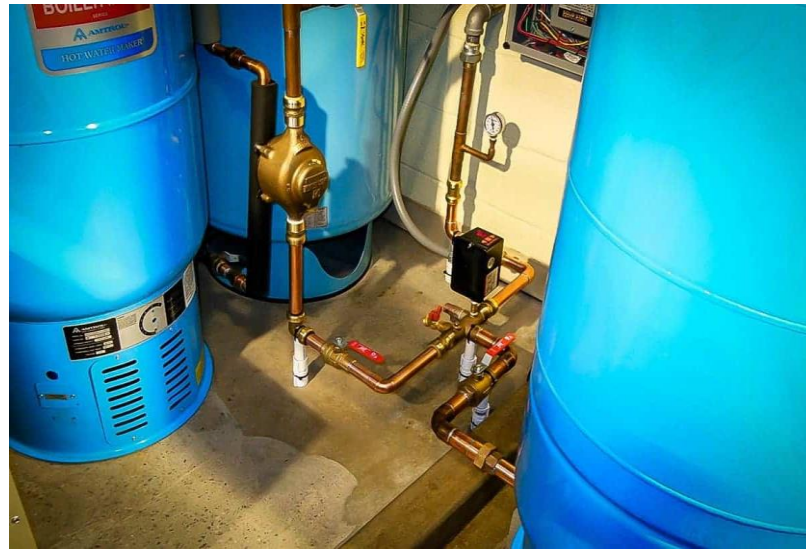


Figure 1. Installation of pressure gauges

Ways to bring the reading back to normal.

If the water pressure in the system is higher than normal, the pressure can be reduced in one of the following ways[22-28].

- Mechanical adjustment of the corresponding relay to 3-4 bar.
- Installation of compensators (safety valves) to drain excess liquid into the sewer if necessary.
- Installation of special 'smart' automatics, capable of independently regulating the water pressure in the water supply system.
- The use of special pumping equipment, membrane hydroaccumulator, storage tank of large volume. At the same time, it should be borne in mind that in case of insufficient flow rate of an artesian well, installation of a booster pump can only aggravate the situation.
- Replacement of the pump unit with a more powerful model. It is recommended to consult with specialists before selecting and purchasing the equipment.

CONCLUSIONS:

1. Adjustment of water head in the autonomous water supply network of the house is a rather complex task associated with a lot of nuances and requiring the intervention of a specialised specialist. To eliminate problems, it is necessary to carry out a professional diagnosis of shut-off valves and filters, as well as correctly measure the water head.
2. We recommend using a high-precision control pressure gauge, as well as regular scheduled maintenance and routine repairs of all elements of the water supply system.
3. Water purification is equally important. A high efficiency filter can reduce the amount of limestone deposits, prolonging the life of the water supply system and pumps.

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