Study on the principle and classification of household water purifier

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Abstract

With the progress of science and technology, household water purifier has become a wind trend. Especially since China's reform and opening up, China's economic system has become more and more perfect, people's quality of life has been gradually improved, and their ideas have begun to change gradually. The pollution of water resources has attracted more and more attention, so the acceptance of household water purifiers has become higher and higher. In this case, the analysis and research of household water purifiers is very important.

Keywords

Principle; classification; household water purifier.

1. Structure and principle of household water purifier

The water purifier can effectively filter rust, sand, colloid, residual chlorine, smell, color, pesticide and other chemicals in the water.

Composition of general household water purifier: low voltage switch; High voltage switch; Booster pump; Wastewater ratio; Water inlet solenoid valve; Flushing solenoid valve; Pressure drum; Inlet small ball valve; Small ball valve of pressure drum; Check valve and check valve; transformer; Computer control board; filter element.

Working principle of household water purifier: the tap water passes through the primary PP cotton fiber filter element to remove large particle pollutants. The generated water pressure opens the low-pressure switch, the pump starts to operate, the inlet battery valve works, and the waterway is opened. The tap water enters the granular activated carbon of the secondary filter element and the fiber filter element of the tertiary filter element to remove small molecular organics, residual chlorine, heterochromaticity Odor, and further effectively remove sediment, colloid, suspended solids, microorganisms, etc. After three-stage filtration, the water enters the booster pump to increase the pressure of the water flow, so that the water flow has enough pressure to pass through the RO reverse osmosis membrane of the four-stage filter element, and the generated wastewater is discharged through the wastewater outlet. The purified high-pressure water will enter the high-pressure switch and then enter the water storage bucket. When the water pressure of the water storage bucket reaches the lowest rated value of the high-pressure switch, it will work and make the pump rotate, When it is higher than the maximum rated value, it will stop working to prevent the pump from running at full speed. After passing through the water storage bucket, the water enters the t33 filter element of the last level 5 filter link. After adjusting the taste, the drinking water is discharged from the gooseneck faucet.

Working principle of filter element: at present, most water purifiers in the market use the principle of resistance screen filtration and progressive structure, which adopts pressure difference to filter tap water. For example, like a screen for sand, material larger than the screen will be intercepted. Substances smaller than the screen will pass through. There is no difference between the quality of water quality and the material of the mesh. The main difference lies in the size of the mesh. The size

of the mesh determines what is filtered. Generally speaking, it is to use various filter materials to isolate harmful substances in water, flow out clean water, and discharge harmful components by cleaning the filter element.

2. Product classification of household water purifiers

2.1 PP cotton filter element water purifier

For the single cylinder water purifier equipped with various PP cotton filter elements, although the price of the water purifier is generally low, the filter element is easy to be blocked, resulting in high replacement frequency and poor filtration accuracy. It is only used to preliminarily filter out large particle pollutants in the water and cannot be used directly.

2.2 Composite sintered activated carbon water purifier

The filter medium is mainly activated carbon rod. Activated carbon rods are generally made of non adhesive materials fired at high temperature and activated carbon powder with the same particle size.

2.3 RO reverse osmosis pure water machine

Although the pure water machine can completely remove the harmful substances in the tap water, at the same time, the minerals in the water are also removed, and the purified water is pure water. The water pressure of the water plant is not enough, so it also needs booster pump, which needs the help of electricity and pressure. It is characterized by more waste water, and 50% of the waste water will be filtered by it. Therefore, its purification cost is relatively high, and its water production is less, so it can only be used to solve the problem of direct drinking.

2.4 Beverage purifier

The composite filtration design of imported coconut shell activated carbon, Japanese ultrafiltration membrane and imported non-woven fabric can not only effectively filter out bacteria in the water, but also remove most of chlorine, pathogenic microorganisms and other harmful substances. The external kettle can avoid excessive heavy metals in thousands of boiling water. To ensure the purification effect of tap water direct drinking is still an integrated design, which can prevent secondary pollution.

2.5 Ultrafiltration machine

It can not only effectively remove suspended solids, sediment, rust, colloids, bacteria and some macromolecular organics in water, but also effectively retain some trace elements and minerals beneficial to us. The utility model has the advantages of large water output, long service life of the filter element, no power on and pressurization, and its cost is low compared with other water purifiers. The ultrafiltration machine is very suitable for the purification of domestic water. However, the major disadvantage is that it can not completely remove heavy metals and organic pollutants in water.

2.6 Ceramic filter water purifier

The size of the membrane hole of the double control membrane ceramic filter element with the highest accuracy of 0.1 is much smaller than that of bacteria. Bacteria can be isolated outside the membrane, but water can pass through, and beneficial minerals and trace elements in the water will be retained. This kind of water purifier generally adopts plug-in ceramic filter element, and the water output is relatively large, which can not only meet the needs of kitchen water, but also will not produce secondary pollution in the water purification process of the water purifier. It is not afraid to block the pipeline and filter element, so as to realize the function of terminal water purification. However, the disadvantage is that the service life of the filter element is relatively short, the replacement cycle is short, and the water output is small.

2.7 Water softener

The biggest function of the water softener is to soften the water, reduce the hardness of the water, and then reduce the generation of scale. The general softening method is to replace calcium and

magnesium ions in water with regenerated sodium resin. This water softener can not play a role in purification, and all kinds of harmful substances in the water can not be removed.

3. Select different water purifiers according to the needs of different regions

In principle, the household water purifier is selected to remove harmful substances visible to the naked eye, such as, colloidal substances, rust odor, residual chlorine, isoodor, some organic pollutants, disinfection by-products, heavy metals, etc., and retain beneficial mineral elements in the water. Because the water quality of each place is different, different regions have different needs, and appropriate water purifiers need to be selected according to the water quality of the region.

1) The hardness of water quality is different in different regions. For example, the limestone area in the South and the limestone area in the South with high hardness water quality in the north of China have high content of calcium and magnesium ions in the water, which is easy to cause scaling. Therefore, an advanced filter water purifier with ion exchange resin filter element should be selected.

2) The chlorine and heterochromatic odor in urban tap water are heavy, and the content of organic matter is more, so the domestic water purifier with more activated carbon load can be selected. Because activated carbon has obvious removal effect on organic matter, and has strong adsorption effect on residual chlorine and heterochromatic odor in water.

3) For purifying urban and rural tap water with turbid water quality, a household water purifier with dual functions of coarse filtration and fine filtration can be selected. In case of serious water pollution, it is necessary to completely filter out any impurities in the water and drink directly without heating, the reverse osmosis pure water machine should be selected.

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