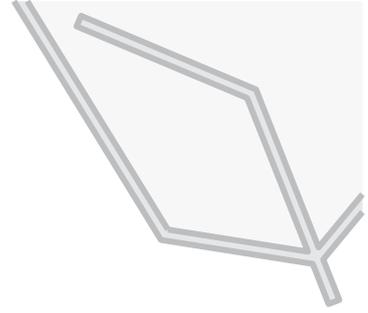




THEMATIC REPORT 05

China Commercial Water Purifier Industry

Edited by China-Italy Chamber of Commerce



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1. Overview of Commercial Water Purifier Industry

Commercial water purifiers in this report refer to the commercial water purification equipment in general. Commercial water purification equipment is a miniaturized advanced water quality treatment device. Its main function is to reduce or remove various harmful inorganics, organics, metals and non-metal ions, high hardness, odor, chroma, residual chlorine, etc. The technology types include ion exchange, activated carbon (particle type, fiber type and felt type), polyester non-woven fabric, UF/MF membrane, RO/NF membrane and other technologies. Water purification equipment generally adopts combined filtration processes, such as ion exchange-activated carbon, filament winding filtration-hollow fiber MF/UF membrane, activated carbon-ultraviolet disinfection, pre-fiber filter-RO-post-activated carbon filter and other types of combined processes. Generally speaking, water purification equipment has undergone the development process from ion exchange, activated carbon adsorption, and filtration to desalination, with a core technology development trend similar to the standard process of China's municipal water treatment plants. The membrane filtration is becoming the mainstream of the third generation of urban drinking water purification process.

Technology Type		Technical Principle	Function	General Name of Relevant Products	
Filtration	General filtration	Filtration with filter screens, such as non-woven cloth	Intercepts solid particles, such as rust and large particles, at a general filtering particle size of 5-200UM	Pre-filter	
		Sand filtration	Water filtration treatment process using natural quartz sand, manganese sand and anthracite as filter materials	Intercepts solid large particulate matters, at a general filtering particle size of 5-200UM	Pre-filter
	Membrane filtration	UF	Filtration and separation technology using the sieving function of membrane	Removes particles, bacteria, viruses, humus, etc., at a filtering particle size of 0.002-0.1UM and an operating pressure of 0.1-0.25Mpa	UF water purifier, water filter, water purifier, straight drinking machine
		MF		Removes solid particles, bacteria, etc., at a filtering particle size of 0.002-0.1UM and an operating pressure of 0.1-0.25Mpa	MF water purifier, water filter, water purifier, straight drinking machine
		NF		Allows solvent molecules or certain low-molecular-weight solutes or low-priced ions to	Removes 30-50% of monovalent salts and 60-80% of divalent salts, at a general interception particle size of 0.01-1nm, an

			penetrate, without obvious boundary with RO	intercepted molecular weight of 200-1000 and an operating pressure of 0.5-1Mpa	
		RO	Through exerting a pressure higher than the osmotic pressure on one side of the liquid to be filtered, to compress the solvent in the original solution to the other side of the semi-permeable membrane, while preventing solute molecules from penetration	Removes more than 90% of monovalent and divalent salts, at an interception particle size less than 0.01nm, an intercepted molecular weight of 200-1000 and an operating pressure of 1-10 Mpa	RO water purifier, water purification machine, water filter, water purifier, straight drinking machine
Adsorption			Utilizes the adsorption function of activated carbon	Adsorbs residual chlorine, organics and some heavy metals in water	Activated carbon water purifier, water filter
Ion exchange			Adopt the cation exchange interaction to use ions to exchange resins	Removes calcium and magnesium ions in water and reduce water hardness	Softening water purifier, water softener

Table 1 Technical Terms and Concepts Relating to Commercial Water Purifier.
Data source: GEP Research.

At present, the commercial water purifier products sold in the Chinese market mainly include commercial water purifier, commercial water purification machine, public water drinking platform, public direct drinking dispenser, commercial pipeline machine, central water purifier, central water softener, automatic water vending machine and water heater (step-by-step type, bar table).

Name	Definition	Core Water Purification Technology
Commercial water purifier	Water purifier is also called water cleaner or filter, which is used for sewage treatment. It almost has no difference with household water purifier, except for the water output. Commercial water purifiers usually adopt central water purifiers, which not only supply water for industrial uses, but also solve domestic water problems, such as daily drinking water, bathing water and washing water for workers.	Activated carbon, MF, UF, NF and RO
Straight drinking machine	This device provides direct drinking water in a similar way to domestic water purification equipment, which filters out impurities in tap water through a built-in filter element and outputs drinking water that meets quality standards. This kind of device is commonly used in public places such as parks, providing convenience for passers-by.	Activated carbon, UF, RO and NF

Water purification machine	It refers to the water purification equipment that removes or reduces salts in water to a certain degree (main strong electrolytes that are soluble in water).	RO
Water boiler	The equipment that heats water through converting electric or chemical energy to thermal energy, with a capacity ranging from 2 liters to 200 liters and a power range from 600W to 22KW according to the needs of different user groups. It is often combined with commercial water purifiers for direct drinking water projects.	Activated carbon, UF and RO
Central water softener	It mainly uses ion-exchange resin to remove calcium and magnesium ions in the water, and reduces water hardness.	Ion exchange technology
Public water drinking platform	It is an energy-saving water drinking platform, which mainly include drinking water equipment installed and applied in public places.	Activated carbon, UF and RO
Commercial pipeline machine	It is generally applied in offices, schools and other places, and is used together with water purification equipment. It contains a built-in PE water tank, through filling with clean water in advance, and then heating by heating tank and cooling by ice tank to produce hot and cold water for drinking. It is divided into wall-mounted pipeline and vertical pipeline. The pipeline machine with filtration system is also called straight drinking machine, which installed water purification equipment inside the pipeline machine, with a standard configuration of 5-level filtration and urban tap water as applicable water source, after 5-level RO membrane filtering (RO straight drinking machine) or 5-level UF membrane (ultrafiltration straight drinking machine) filtering, the filtered water directly enters the pipeline machine system, which could be directly consumed with heating and cooling functions.	UF and RO
Water vending machine	The equipment integrating centralized automatic water production function with automatic water selling function installed in the community provides users with pure drinking water 24 hours per day.	Activated carbon, UF and RO

*Table 2 The Commercial Water Purifier Products Sold.
Data Source: GEP Research.*

2. Analysis of the External Environment for Commercial Water Purifier Industry

2.1. Analysis of the Impacts of Macro Environment on Commercial Water Purifier Industry

2.1.1. China's per capita water resources

Resource-based water shortage and quality-induced water shortage are the main causes of water shortage. China is one of the countries with the poorest water resources around the world. Its per capita water resource volume accounts for only 34.8% of the world average volume, which is far less than Canada, New Zealand, Russia and other countries. The spatial and temporal distribution of water resources is uneven in China. From a spatial point of view, water resources are concentrated in areas in the south of the Yangtze River, while the northern areas such as Beijing, Tianjin, Hebei. The Northwest and Liaodong Peninsula are particularly deficient in water resources. From a temporal point of view, the rainfall, affected by the monsoon, in most areas is concentrated in summer. In addition, the water sources pollution has increased the tension situation in water resources.

2.1.2. Problems and Pollution of Water Environment

The problems related to water environment, on the one hand, are the consequence of ignoring the places that should be treated. On the other hand, they represent the failure to meet the requirements of discharge standards with respect to the treatment results. In recent years, China has attached increasing importance to the treatment of water pollution. It has successively introduced the "river chief system" and "lake chief system", which strengthened the treatment of black and odorous water bodies, raised urban sewage treatment standards, and paid attention to rural sewage treatment. This series of treatment measures have achieved certain results in improving the water environment in China, but the overall situation is still grim.

2.2. Analysis of Technical Policy Environment

Up to now, China has released 18 standards to regulate the development of the commercial water purifier industry. With the official implementation of *the Management Measures for Water Efficiency Labels* and the introduction of *the National Standards for the Limit Values and Grades of Water Efficiency for Reverse Osmosis Water Purifiers*, China has also strengthened the constraints in the water purification market.

2.2.1. Implementation of the First Mandatory Standard in the Water Purification Industry

In November 2017, the General Administration of Quality Supervision, Inspection and Quarantine of the PRC officially issued the national standard *GB34914-2017*, i.e., *the Limit Values and Grades of Water Efficiency for Reverse Osmosis Water Purifiers*. It drew up a red line to strictly control water consumption efficiency for implementing the strictest water resource management system. It became effective on November 1, 2018.

This standard specified the water efficiency limit values and the grades of reverse osmosis water purifiers for household and similar uses, as well as the detection and calculation methods for the purified water production rate. It divided the water efficiency of reverse osmosis water purifiers into 5 grades. It also set a red line for the purified water production rate, i.e., the minimum purified water production rate should be no less than 35% (grade 5 water efficiency). The reverse osmosis water purifiers below this limit were prohibited from sale. Through setting the limit values of water efficiency, 30% of water purifiers with high waste water rate would be eliminated from the market.

The promulgation of such standard indicates that China will compulsorily restrict the standardized production in the water purification market, while forcing innovation in water purification technology, and accelerating the industrial reshuffling in the next 2-3 years.

Water Efficiency Grade of Water Purifier	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Purified Water Production Rate/%	≥60	≥55	≥50	≥45	≥35

Table 3 Water Efficiency Grade Index of Water Purifier.

Data source: GB34914-2017 - the Limit Values and Grades of Water Efficiency for Reverse Osmosis Water Purifiers and GEP Research.

2.2.2. Gradual Improvement of Industrial Safety Standards

At present, the safety standards involved in the water purification industry are mainly based on the general requirements of GB4706.1-2005, i.e. *the Safety of Electrical Appliances for Household and Similar Uses*, lacking professional safety standards for water purification equipment. In 2018, China has set up a project and commenced to draft the safety standards for water purification products. *The Special Requirements of Safe Drinking Water Purification Devices for Household and Similar Electrical Appliances* would highlight five aspects, including protection against electric shock, heat hazards, mechanical hazards, fire hazards, and poisoning hazards.

In addition, in 2018, the industry standards of QB/T4143-2018 - *the Ultrafiltration Water Purifiers for Household and Similar Uses* and QB/T4144-2018 - *the Reverse Osmosis Water Purifiers for Household and Similar Uses* were developed. They have regulated the production and sales of water purification products, and have directed the path towards quality upgrade and clear consumption.

3. Demand Analysis and Prospect Forecast Concerning the Commercial Water Purifier Industry in China

3.1. Demand Market Capacity and Market Penetration of the Commercial Water Purifier Industry

In recent years, the commercial water purifier market has developed rapidly in China, especially since the growth rate of the household market slowed down in 2015. The commercial water purification has shown a unique outshining status with a huge future development space, which is a growth pole in the water purification industry. According to the data collected by GEP Research, the market scale of the commercial water purifier industry in China increased from RMB 7.8 billion in 2013 to RMB 18.6 billion in 2017, with an annual compound growth rate of approximately 24.3%. From the perspective of development trends, the commercial water purification field shows strong growth potentials. It is expected that the market scale of the commercial water purifier industry in China will grow at an annual compound growth rate of 18.8% in the next 5 years. In 2018, the market scale of the commercial water purifier industry in China reached RMB 22.3 billion and by 2022 it will reach RMB 44 billion.

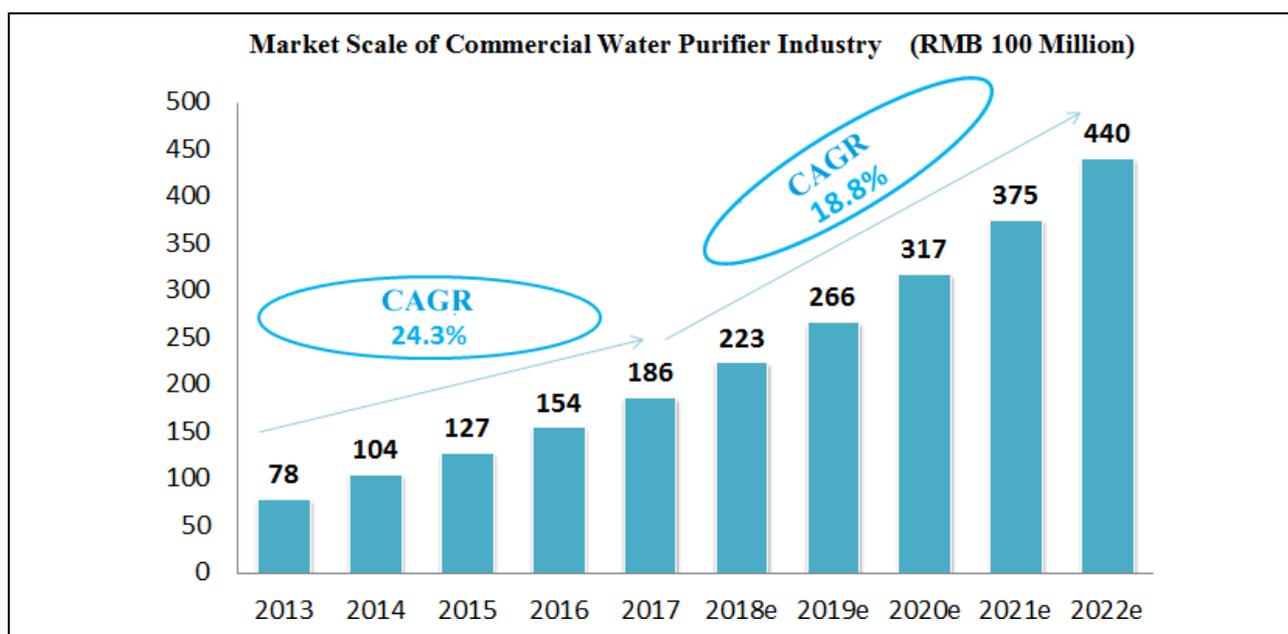


Figure 1 2013 – 2022 Market Scale of the Commercial Water Purifier Industry in China.
Data source: GEP Research.

Compared to developed countries, the market penetration rate of the water purifier industry in China is very low. At present, it is about 21.7%, while the penetration rate of the water purifier industry in South Korea is about 84.6%, in Japan is about 78.8%, and in the United States and the European Union are 72.9% and 70.1% respectively. The low penetration rate of the water purifier industry market is mainly caused by the following reasons. First, compared with developed countries, the urbanization rate is relatively low and the total volume of the water purifier industry is correspondingly small in China. Secondly, for a long time consumers have used boiled water as the main source of drinking water, therefore, they lack relevant knowledge about water purification processes. In addition, secondary pollution is more likely to occur in

barreled water, pipeline networks, and secondary water supply, but the consumer do not have a comprehensive understanding of secondary pollution. With the improvement of urbanization and education level, the market penetration rate of the water purifier industry in China is expected to reach 37.9% by 2022.

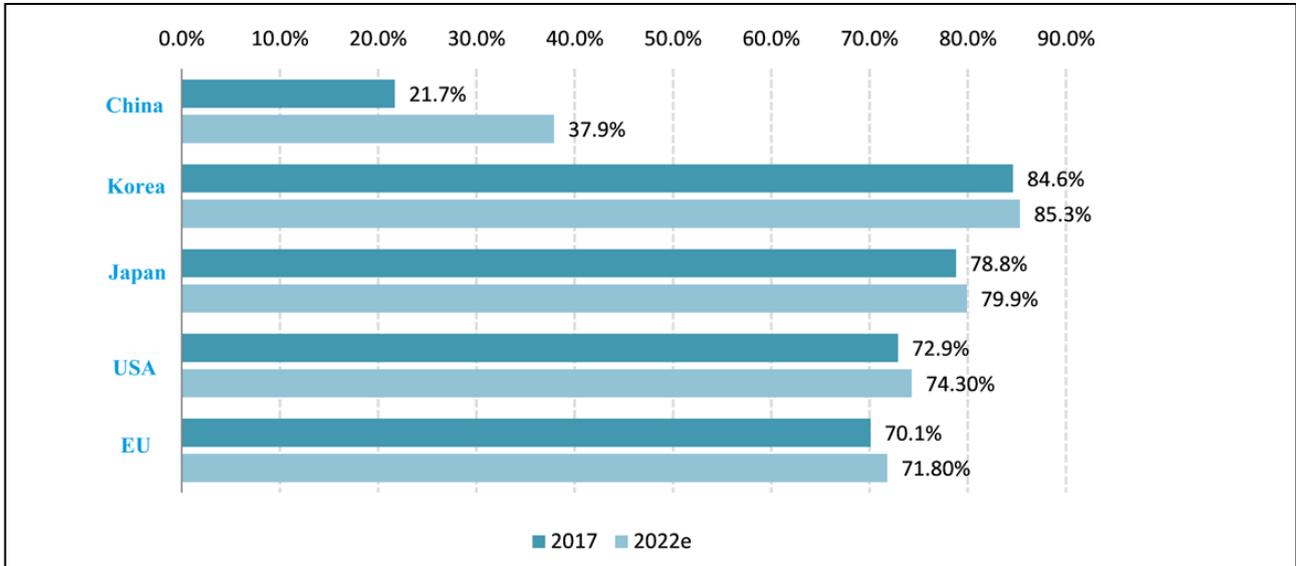


Figure 2 2017-2022 Market Penetration Rate of the Water Purifier Industry in China.
Data source: GEP Research.

In terms of commercial water purification, compared with the penetration rate of water purification market in developed countries, the public water purification services in China are still very backward. According to the data, the public drinking water services are developed in Europe, America, Japan, South Korea and other countries, with a penetration rate of commercial water purifiers all reaching more than 80%, while the penetration rate of commercial water purifiers in China is very low, at a rate of less than 10%. Therefore, there is a large market potential based on the low penetration rate of commercial water purification in China, and the medical institutions, government agencies, universities, commercial buildings and other public places have huge demand for water purification.

3.2. Demand Prospects for Subdivided Products of Commercial Water Purifiers

From the perspective of subdivided product structure, reverse osmosis technology products occupy the dominant position in the commercial water purifier market, with a market share of more than 80%. The proportion of nano-filtration technology in purified beverage equipment has also increased. Out of the pursuit of water quality safety, the proportion of reverse osmosis machines in commercial water purifiers will further increase in the future. In 2017, according to the statistical data of GEP Research, the market scale of the reverse osmosis commercial water purifier market in China reached RMB 15.25 billion. It is estimated that the market scale of the reverse osmosis commercial water purifier market in China will grow at an annual compound growth rate of 19.6% in the next five years and will reach RMB 37.4 billion by 2022. The market scale of nano-filtration commercial water purifier market will grow at an annual

compound growth rate of 23.8%, and will reach RMB 3.08 billion by 2022.

Time	Market Scale (RMB 100 Million)				
	Reverse Osmosis	Ultrafiltration	Nano-filtration	Activated Carbon	Other
2017	152.5	15.8	10.6	5.8	1.9
2022e	374	22	30.8	8.8	4.4
Expected Compound Growth Rate	19.6%	6.8%	23.8%	8.8%	18.8%

Table 4 2017-2022 Market Scales of Subdivided Technology Products of Commercial Water Purifier in China.
Data source: GEP Research.

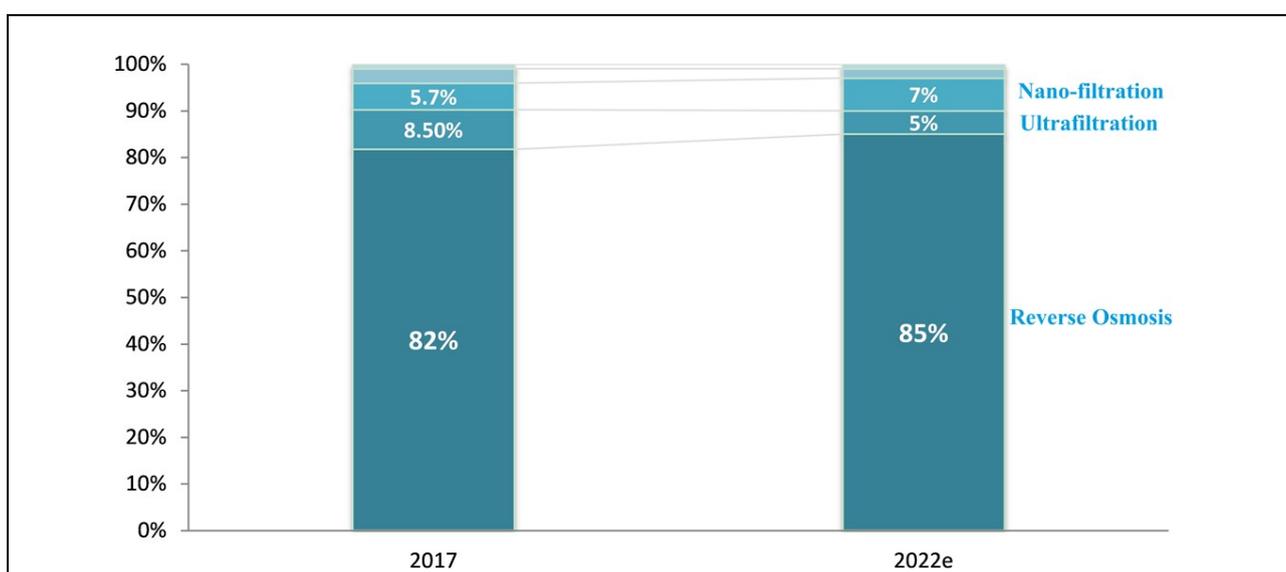


Figure 3 Market Share Trend for Subdivided Technology Products of Commercial Water Purifier in China.
Data source: GEP Research.

3.3. Demand Development and Driving Factors

The increasing serious water pollution, the relatively low market penetration, the huge market potential and the lower water purifier use costs have become the main factors driving the development of the commercial water purifier market.

3.3.1. Increasingly Serious Water Pollution

Water is the source of life. However, due to the lack of safety awareness, water pollution has become a serious environmental problem in China. Each year, there are thousands of water pollution accidents endangering the environment and human health. The sources of water pollution are mainly from industrial, agricultural and sanitary wastewater. A large number of lakes, rivers, reservoirs and groundwater are no longer drinkable due to severe pathogenic microorganisms, metal ions, and chemical pollutants. Many pollutants cannot be removed by traditional water treatment methods, and secondary pollution is likely to occur in the transportation and storage process of drinking water. Even after removing the pollutants,

boiled water is still not drinkable because some metal ions and chemicals cannot be eliminated by boiling.

3.3.2. Low Penetration Rate and Large Potential of Commercial Water Purification Market

The motivation that promotes the development of commercial water purifiers mainly comes from the low market penetration and huge market potential. In the office buildings, hospitals, schools, restaurants, and other commercial facilities that stress the importance of the safety of drinking water, there is usually a huge flow of people. However, most public facilities still mainly rely on traditional drinking water methods such as boiled water and bottled water. Through installing water purifiers in these commercial facilities, it could effectively solve part of the drinking water health and safety issues.

The drinking water market in China is divided into residential drinking water market and commercial drinking water market. According to the statistical data of GEP Research, the commercial drinking water consumption in China has maintained a steady growth, with a total consumption volume of commercial drinking water increasing from 319.6 billion liters in 2013 to 344 billion liters in 2017, and is expected to further increase to 378.4 billion liters by 2022. The consumption volume of commercial drinking water treated through water purifiers increased from 33.4 billion liters in 2013 to 81.2 billion liters in 2017 at an annual compound growth rate of 24.9%. It is expected that the consumption volume of commercial drinking water treated through water purifiers will continue increasing at an annual compound growth rate of 13.7% in the next five years.

At present, the commercial drinking water in China mainly includes boiled water, packaged water, and water treated by water purifiers. In the commercial sector, boiled water is still the most commonly used method of drinking water, mainly because of its low price and because the most commercial consumers are still used to drinking boiled water. In particular, some large commercial areas, such as factories, public institutions, and government organizations often employ workers to be responsible for boiling water, filling water into thermos bottles and distributing these bottles to company employees. In addition, in virtue of the relatively high holding capacity of drinking dispensers, according to the statistical data of GEP Research, the proportion of bottled water increased from 24.2% in 2013 to 32.2% in 2017. In the future, the proportion of bottled water will continue to increase, but its growth rate will slow down. It is expected that the proportion of water treated by water purifiers in the commercial drinking water consumption volume will continue maintaining a rapid growth trend, and the proportion of consumption volume of commercial drinking water treated by water purifiers will increase from 23.6% in 2017 to 40.8% in 2022



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