MWA Consumer Confidence Report 2022

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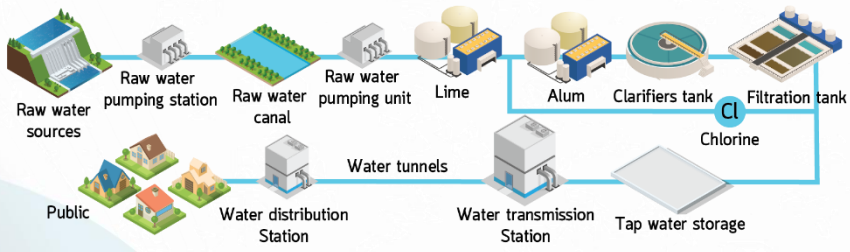
This is an abridged edition of an annual report on the tap water quality of Metropolitan Waterworks Authority (MWA). The objective is to provide information on tap water quality in Bangkok, Nonthaburi and Samut Prakan service areas.

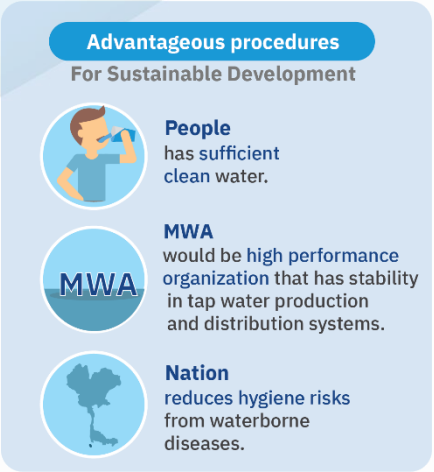
Raw Water Sources Raw water sources of MWA are from Chao Phraya river and Maeklong Dam.

- Chao Phraya River: Abstracting raw water from Chao Phraya River at Samlae raw water pumping station, Pathum Thani province, to East Prapa Canal. The water is transmitted to Bangkhen Water Treatment Plant (WTP), Samsen WTP, and Thonburi WTP. MWA uses raw water from the middle or second section of the Chao Phraya River, which is classified according to surface water quality standards classes as class III referred to moderate quality and class IV referred to poor quality. The significant water quality problems are filter clogging algae, sea water intrusion during drought season, organic contamination, and high raw water turbidity during rainy season. These problems have an effect on tap water production and tap water quality.
- Maeklong Dam: Abstracting raw water from Maeklong Dam at Tha muang raw water pumping station Kanchanaburi province, to West Prapa Canal. The water is transmitted to Mahasawat WTP. The water quality from the west source is classified as surface water quality standards class III. The significant problem is high raw water turbidity during rainy season which high turbidity water was caused by natural turbidity of Kwai Noi River and Kwai Yai River. However, the turbidity would be decreased after the confluence of both rivers, where the tributary join to be Maeklong River and flowing to West Prapa Canal. Mostly, with this process, high turbidity causes no effect on Mahasawat tap water production. However, it may contribute to high turbidity problem about 1-2 months depended on cases of storms and rainfall in each year.

Water Treatment Raw water flowing through the canal will naturally improve in quality. Coarse and fine screens are installed at treatment plant's raw water pumping unit to remove waste and floating materials. Pre-lime is added for control the pH in order to improve precipitation efficiency. Pre-chlorination will be used to reduce color, odor, and algae. Then an appropriate amount of alum would be dosed. In the clarifiers, water will be mixed with chemicals then react with the suspended particles. After that, the suspended particles will coagulate together and sink to the bottom of the tank and clear water continues to the filtration tank. Water flow through anthracite coal and sand in filtration process. Chlorine is added at this step to ensure that almost microorganisms are killed or inactivated as well as the removal of organic matter, odor, color, and ferrous. In addition, tap water contains Free Residual Chlorine, which eliminates bacteria that could later cause contamination. Tap water is pumped to the water transmission station and water distribution station via water tunnels and trunk mains. The water is then pumped into the supply pipes to service the public. At every stage of water treatment process, the scientists would monitor water quality closely. MWA is also sampling water from the water distribution system throughout the service area and tested for approving its quality in a laboratory accredited with ISO/IEC 17025.



Water Safety Plan MWA applied the principles of the World Health Organization's (WHO) Water Safety Plans (WSPs) in every steps of water production process. WSPs is water quality management plans which take on risk management techniques to ensure the safety of a tap water. It composes of 3 principals (1) PROTECTS water sources from contamination (2) REMOVES contaminants by water treatment process (3) PREVENTS water from re-contaminating in the distribution process to users. One could even say that WSPs is to supervise water quality from upstream to downstream or the water user's house. It also helps to make the water treatment process more efficient and can check every step to ensure that public always have safe and clean tap water sufficiently.



Tap Water Quality 2022

Parameters	Satisfy criteria	Average Value	Units	MWA's specification	Likely sources of contamination
Biological Aspect					
E. coli	✓	Absence	Presence-Absence per 100 mL	Absence	Pipe leakage or lack of proper filter maintenance Sewage, agricultural, or industrial communities
Pathogenic Bacteria*	✓	Absence	Presence-Absence per 100 mL	Absence	Pipe leakage or lack of proper filter maintenance Sewage, agricultural, or industrial communities
Legionella spp.	✓	Absence	Presence-Absence per 100 mL	Absence	Lack of proper building's water supply system maintenance
Physical – Chemical Aspect					
Residual Chlorine	✓	0.73	mg/L	0.2 – 2.0	Chlorine disinfection
Turbidity	✓	0.32	NTU	≤ 1.0	Pipe leakage or Lack of proper buildings water supply system maintenance
pH	✓	7.30	-	6.5 – 8.5	Naturally occurring element, Sewage, agricultural, or industrial communities
Conductivity	-	316	µs/cm	≤ 300	Naturally occurring element, sea water intrusion Sewage, agricultural, or industrial communities
Total dissolved solids	✓	193	mg/L	≤ 1,000	Naturally occurring element, sea water intrusion Sewage, agricultural, or industrial communities
Total hardness	-	106	mg/L	-	Naturally present in the environment
Chloride	✓	25	mg/L	≤ 250	Naturally present in the environment Sewage or sea water intrusion
Sodium	✓	20	mg/L	≤ 200	Naturally present in the environment Sewage or sea water intrusion
Calcium	-	30	mg/L	-	Naturally present in the environment
Fluoride	✓	0.29	mg/L	≤ 0.7	Naturally present in the environment
Iron	✓	0.06	mg/L	≤ 0.3	Corrosion of household plumbing, Naturally present in the environment
Aluminum	✓	0.091	mg/L	≤ 0.2	Naturally present in the environment
Zinc	✓	0.0021	mg/L	≤ 3	Corrosion of household plumbing, Naturally present in the environment
Arsenic	✓	0.0031	mg/L	≤ 0.01	Sewage, agricultural, or industrial communities
Lead	✓	0.003	mg/L	≤ 0.01	Sewage, agricultural, or industrial communities
Chromium	✓	< 0.002	mg/L	≤ 0.05	Sewage, agricultural, or industrial communities
Cadmium	✓	0.0003	mg/L	≤ 0.003	Sewage, agricultural, or industrial communities
Copper	✓	< 0.05	mg/L	≤ 1	Corrosion of household plumbing, Sewage, agricultural, or industrial communities
Mercury	✓	0.0007	mg/L	≤ 0.006	Sewage, agricultural, or industrial communities
THMs	✓	0.04	Sum of ratio	≤ 1	Chlorine disinfection by-product

Note * *Vibrio cholerae*, *Salmonella* sp., *Shigella* sp., *Staphylococcus aureus*, *Clostridium perfringens*

Regularly analyzed parameters have complied with MWA's specification

Virus: Poliovirus, Rotavirus, Hepatitis A Virus, Norovirus

Radioactive: Gross alpha activity, Gross beta activity

Pesticides: Atrazine, Carbofuran, Chlorpyrifos, DDT, Glyphosate and Paraquat

Volatile organic compounds (VOCs) Benzene derivatives group: Benzene, Toluene, m-Xylene, Styrene, Isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, and Tertiary Butyl Benzene

Scan for tap water quality completed version.

Good to know about water quality.

⊕ Why does the faucet tend to have white stains?

Ans White stains on faucets or sanitary ware are scale or limescale which is caused by minerals in tap water such as Calcium, Magnesium, etc. MWA's tap water has many dissolved minerals in the right amount and not exceeding the criteria. White stains can be easily removed using lemon peels or vinegar wipe regularly.

⊕ Does drinking tap water cause kidney stones?

Ans Drinking tap water does not cause kidney stones. Human body temperature is normally unable to mineralize the water you drink to kidney stones, scale or dregs and clog human organs.

The causes of kidney stones have many factors, such as genetic, metabolism, lifestyle, food consumption, amount of drinking water or certain medications consumption. The ways to take care of yourself to prevent kidney stones are; drink enough water everyday, do not consume too much of any type of food for a long period and exercise regularly.

⊕ Why shouldn't water pump be connected to distribution pipes directly?

Ans If there's a leak in the distribution pipes and water pump connect to the distribution pipes directly, water pump will suck the dirt and contaminants from outside into the pipe and mix with tap water. Tap water may become dirty, contaminated with germ and may has foul odors. Dirt, gravel, rocks or sand can damage water pump and tap water related equipment, such as faucets, water purifiers, water heater. In addition, directly connecting the water pump to the distribution pipe also cause trouble to your neighbors who use tap water from the same pipeline. So people must refrain from connect water pump to distribution pipes directly and install water pump to the water tank instead.

⊕ If MWA claim that tap water is clean, what does the dirty of a storage tank and a filter come from?

Ans Although tap water, which the turbidity is lower than 1 NTU, is so clear, the suspension solid is still remain, which has no an effect on health. For the turbidity of water < 1 NTU, the suspension solid is too less to be visible. Moreover, the 1 NTU turbidity followed MWA Guidelines for Tap Water Quality is lower than 5 times of the notice of Department of Health on the Drinking-water Quality Standard and 4 times of WHO Guidelines for Drinking-water Quality. In case of storing water for a long time or use expired filter, the sediment will still collect in the bottom tank or in a filter. Therefore, you should clean your storage tank at least every 6 months and usually change your filter periodically according to handbook stated.

⊕ Why should you clean a storage tank constantly?

Ans Constantly clean the storage tank will prevent accumulating sediment. Even the tank is closed but it is not completely seal, so it may contaminate with pathogen from an environment or air. In general, tap water in distribution system has free residual chlorine enough to disinfect the pathogen for prevent post contamination. However, the chlorine in the tank will decompose as a function of time and may not be sufficient for disinfection and the pathogen may grow up in the tank. Therefore, regularly clean the tank at least every 6 months will reduce risk for deterioration of the water quality in the tank.

⊕ What should you do if finding red worms in tap water?

Ans Red worms are larvae of some insects, which lay their eggs in stagnant water. It is found in an opened storage tank or a broken tank, which lacks of cleaning. WTP of MWA has clarification, filtration, and disinfection processes. These processes remove all of the impurity and contamination before transmit to our customers. Therefore, MWA confirms that red worms are absolutely not found in tap water.

However, you should always close water tank lid, clean, and check breaking points of your storage tanks. The water tank lid should properly close, clean, and always inspect cracks. A water hose should usually keep tidy, it should not be laid on the ground or leave on the dirty place. Besides, pump installation after a storage tank is recommended for our customers while pumping directly from the MWA pipe is prohibited.

⊕ Does tap water be able to use for cooking rice or food?

Ans Tap water is safe for cooking rice and food. A collaboration of Institute of Food Research and Product Development (IFRPD), Metropolitan Waterworks Authority (MWA), and Provincial Waterworks Authority (PWA) conducted the experiment in the topic "Rice Cooking with Tap Water" to analyze for the emerging of trihalomethanes (THMs) in tap water, water from washing rice, rice cooking water, milled rice, and cooked rice. The results indicated that only a little THMs was be presented in all samples, which is much lower than WHO Guidelines for Drinking-water Quality. Therefore, tap water is safe for consume and does not lead to cause cancer disease from THMs.

⊕ Read more in "MWA TAP WATER's FAMILY"

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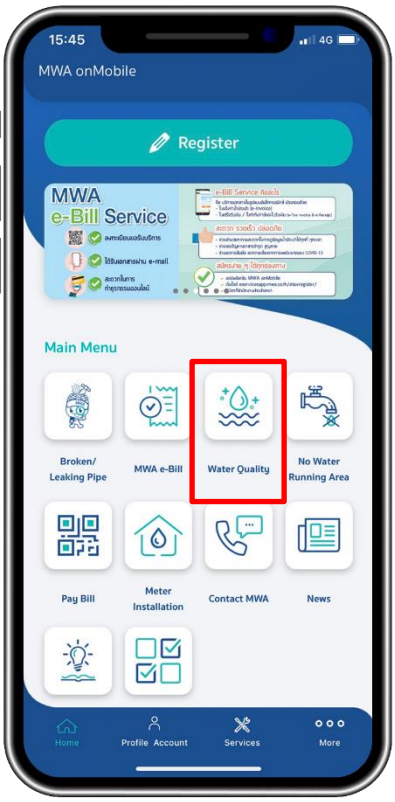

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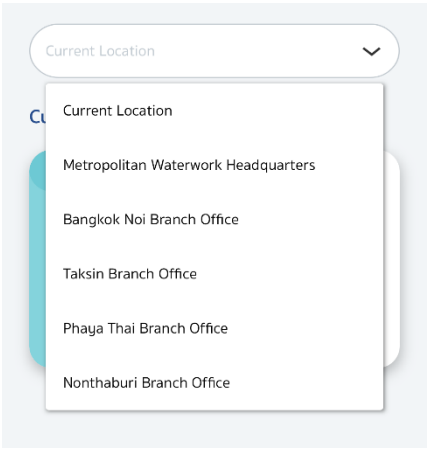

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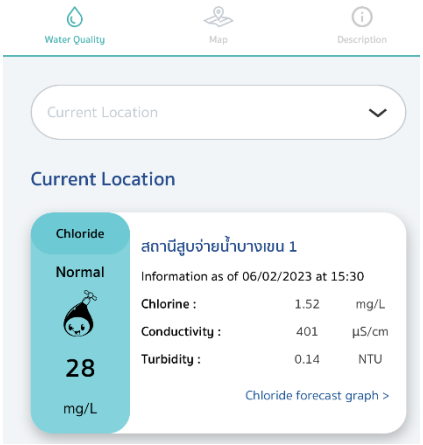

Water Quality Analysis Service

The Water Quality Department has been accredited with the laboratory competency standard ISO/IEC 17025. Our services ensure fast and accurate results with fair prices.

MWA conducts testing of **tap water**, **drinking water**, **ground water** & **surface water**
According to MWA’s specification, WHO’s Guidelines,
TIS’s drinking water, FDA’s standard,
Surface Water Quality Standards & Groundwater quality standards

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