

Q&A

11Q4: In Japan, is there water quality standard of raw water (surface water) used for water supply?

A1: There is no raw water quality standard for water supply use in Japan. You can use any water as raw water whenever you can ensure drinking water quality standard (DWQS) after an appropriate treatment. An article of Waterworks Law shows "An intake facility should be possible to take necessary amount of water with water quality as good as possible". It means you can reduce or stop intake of raw water when its quality becomes worse. It is expected that the environment around water source is kept well. For this purpose, the basic Environment Law establishes two kinds of Environmental Quality Standard relating to water pollution.

1) The first standard shown Table 1, is concerned with protecting human health in any public water bodies. The standard values of 27 items are established as desirable values for achieving and maintaining public water bodies. Most of items of this standard are also included in DWQS and their standard values are just same as DWQS. For these items, you can ensure DWQS easily in the case that the raw water quality meets this standard unless the treatment and distribution process increase concentration of some items.

2) The second standard is concerned with the living environment including water supply. The exception on water supply use from this standard is shown in Table 2. A prefectural governor¹ can designate a class of public water bodies according to water use and the situation to prevent further deterioration by activating the standard.

These environmental quality standards can be used as the indicator of enough quality for raw water. Then these two environmental quality standards seem de facto raw water quality standard for water supply.

Table 1. Environmental quality standard for protecting human health

Item	Standard value	Item	Standard value
Cadmium	0.003mg/L or less	1,1,2-Trichloroethane	0.006mg/L or less
Total cyanide	no detection	Trichloroethylene	0.03mg/L or less
Lead	0.01mg/L or less	Tetrachloroethylene	0.01mg/L or less
Chromium(VI)	0.05mg/L or less	1,3-Dichloropropene	0.002mg/L or less
Arsenic	0.01mg/L or less	Thiram	0.006mg/L or less
Total mercury	0.0005mg/L or less	Shimazine	0.003mg/L or less
Alkyl mercury	no detection	Thiobencarb	0.02mg/L or less
PCB	no detection	Benzene	0.01mg/L or less
Dichloromethane	0.02mg/L or less	Selenium	0.01mg/L or less
Carbon tetrachloride	0.002mg/L or less	Nitrate and nitrite as nitrogen	10mg/L or less
1,2-Dichloroethane	0.004mg/L or less	Fluoride	0.8mg/L or less
1,1-Dichloroethylene	0.1mg/L or less	Boron	1mg/L or less
cis-1,2-Dichloroethylene	0.04mg/L or less	1,4-Dioxane	0.05mg/L or less
1,1,1-Trichloroethane	1mg/L or less		

Note: Standard values are for annual average except total cyanide which value is for the highest value in a year

Table 2. Exemption for water supply use
from Environmental quality standard for protecting the living environment

River								
Class	Use	pH	BOD	SS	DO	Coliform group		
AA	Water supply 1	6.5-8.5	1mg/L or less	25mg/L or less	7.5mg/L or more	50MPN/100mL or less		
A	Water supply 2	6.5-8.5	2mg/L or less	25mg/L or less	7.5mg/L or more	1,000MPN/100mL or less		
B	Water supply 3	6.5-8.5	3mg/L or less	25mg/L or less	5mg/L or more	5,000MPN/100mL or less		

Lake (natural lake and reservoir which capacity is more than 10million cubic meter and detention time is longer than 4 days)								
Class	Use	pH	BOD	SS	DO	Coliform group	Total nitrogen	Total phosphorous
AA	Water supply 1	6.5-8.5	1mg/L or less	1mg/L or less	7.5mg/L or more	50MPN/100mL or less	0.2mg/L or less	0.01mg/L or less
A	Water supply 2,3	6.5-8.5	3mg/L or less	5mg/L or less	7.5mg/L or more	1,000MPN/100mL or less	0.2mg/L or less	0.01mg/L or less

Note	Water supply 1:	Simple treatment with only filtration						
	Water supply 2:	Conventional treatment with sedimentation and filtration						
	Water supply 3:	Advanced treatment with some pre-treatment and/or advanced technology						

1: Public water bodies extend over plural prefectures are designated to a class by central government
Water quality standard of harmful substance is decided with considering its influence to human health.
(A1, Answerer: Mr. SASAYAMA Hiroshi, JWVA, 2017)

A2: We have Drinking Water Quality Standards, which is stipulated in Japanese Water Works Law. On the other hands, we don't have specific standard values for raw water. However, water utilities confirm whether or not their water purification plants enable to treat the raw water to meet the standards at purified water. For that reason, we inspect necessary items of water quality such as Drinking Water Quality Standards except for 11 DBPs (Disinfection By-Products) and taste, THMFP (Trihalomethane Formation Potential), algae and pesticides. For example, if you draw from surface water, the turbidity would increase dramatically due to heavy rain. It might be difficult to purify such turbid water. In that case, you conduct some measures such as the change of dosing rate of coagulant or the control of water intake.

As I tell you before, we don't have the standard value for turbidity in raw water, and it depends on the water purification process or the purified ability of the plant. Furthermore, we also have "the Guideline for Protection of Waterworks from Cryptosporidium"². It sets that in the case the water utilities use surface water which has a risk of Cryptosporidium, they should establish filtration system and check Cryptosporidium in the raw water periodically.

2: Outline of "the Guideline for Protection of Waterworks from Cryptosporidium"

(A2, Answerer: Mr. SUGINO Manabu, Osaka Water Supply Authority)