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Prepared By: FAS China Staff, Josh DeMoss

Approved By: Adam Branson

Report Highlights:

The National Standard for Irrigation Water Quality (GB5084-2021) was published jointly by the State Administration for Market Regulation (SAMR) and Ministry of Ecology and Environment of the People's Republic of China on January 20, 2021 and it entered into force on July 1, 2021. The standard regulates the quality requirements for farmland irrigation water and monitoring and analysis methods. This report provides an unofficial translation of the published standard. Stakeholders should conduct their own review of the regulation. This report is being published and shared by FAS China now owing to its relevance to the recent WTO notification on the Code of Practice for Prevention and Reduction of Lead Contamination in Foods.

BACKGROUND

On July 11, 2024, the PRC notified a new National Food Safety Standard for the Code of Practice for the Prevention and Reduction of Lead Contamination in Foods to the WTO under G/SPS/N/CHN/1312. This national standard was referenced in that notification. To view the notified draft, refer to FAS China GAIN report [CH2024-0097](#). This National Standard for Irrigation Water Quality may be relevant for numerous PRC standards and stakeholders are encouraged to undertake their own review of the material.

BEGIN UNOFFICIAL TRANSLATION

National Standard for Irrigation Water Quality

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Preface

This standard was formulated in accordance with the Environment Protection Law of the People’s Republic of China, Law on the Prevention and Control of Contamination in Agricultural Land, and Law of Prevention and Control of Water Contamination, to strengthen the supervision of farmland irrigation water quality and to ensure the safety of cultivated land, groundwater, and agricultural products.

This standard specifies the requirements for farmland irrigation water quality, and monitoring and supervision management.

This standard was first issued in 1985 and was revised twice in 1992 and 2005 respectively. This version is the third revision. The main changes of this edition are:

1. Modified the scope of application for the standard;
2. Updated of normative reference documents;
3. Added terms and definitions such as farmland irrigation water, paddy field crops, and dry land crops;

4. Added control values for 9 farmland irrigation water quality items such as total nickel, chlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, nitrobenzene, toluene, xylene, cumene, and aniline;
5. Modified the monitoring requirements for farmland irrigation water quality;
6. Added the implementation and supervision provisions of the standard.

From the date of implementation of this standard, the “Farmland Irrigation Water Quality Standard” (GB 5084-2005), “Limits of Chlorobenzene, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Nitrobenzene in Irrigation Water” (GB 22573-2008), “Limits of Toluene, Xylene, Isopropyl benzene, Phenol, and Aniline in Irrigation Water” (GB 22574-2008) shall be abolished.

This standard is the basic quality requirement for farmland irrigation water. Provincial governments may formulate local farmland irrigation water quality standards for items not specified in this standard; for items already specified in this standard, they may formulate local farmland irrigation water quality standards that are stricter than this standard. Local farmland irrigation water quality standards shall be filed with the ecological environment authorities of the State Council.

This standard was formulated by the Soil Ecology and Environment Department and the Regulations and Standards Department of the Ministry of Ecology and Environment. The main drafting units of this standard include Chinese Research Academy of Environmental Sciences, Nanjing Institute of Environmental Sciences of the Ministry of Ecology and Environment, Soil and Agricultural and Rural Ecological Environment Supervision Technology Center of the Ministry of Ecology and Environment, and Environmental Protection Research and Monitoring Institute of the Ministry of Agriculture and Rural Affairs.

This standard was approved by the Ministry of Ecology and Environment on January 9, 2021.

This standard shall enter into force on July 1, 2021.

This standard shall be interpreted by the Ministry of Ecology and Environment.

1. Scope of Application

This standard specifies the quality requirements, monitoring and analysis methods, and supervision and management requirements for farmland irrigation water.

This standard applies to the supervision and management of water quality using surface water and groundwater as farmland irrigation water sources. Urban sewage (except industrial wastewater and medical wastewater) and unutilized livestock and poultry breeding wastewater, agricultural products processing wastewater, and rural domestic sewage entering the farmland irrigation channel, and the water quality of the nearest intake point downstream shall be supervised and managed in accordance with this standard.

2. Normative References

This standard refers to the following regulations or their provisions therein. For any dated referenced document, only the dated version applies to this standard. For any undated referenced document, the latest version (including all amendments) applies to this standard.

GB 7467 Water quality determination of hexavalent chromium diphenyl carbohydrazide spectrophotometric method

GB 7475 Water quality determination of copper, zinc, lead, and cadmium atomic absorption spectrophotometric method

GB 7484 Water quality determination of fluoride ion selective electrode method

GB 7494 Water quality determination of anionic surfactants methylene blue spectrophotometric method

GB 11889 Water quality determination of aniline compounds N-(1-naphthyl) ethylenediamine azo spectrophotometric method

GB 11896 Water quality determination of chloride silver nitrate titration method

GB 11901 Water quality determination of suspended solids gravimetric method

GB 11912 Water quality determination of nickel flame atomic absorption spectrophotometric method

GB 13195 Water quality determination of water temperature thermometer or inversion thermometer method

GB 20922 Urban sewage recycling and agricultural irrigation water quality

GB/T 15505 Water quality determination of selenium graphite furnace atomic absorption spectrophotometric method

GB/T 16489 Water quality determination of sulfide methylene blue spectrophotometric method

HJ/T 49 Water quality determination of boron curcumin spectrophotometric method

HJ/T 50 Water quality determination of chloral pyrazolone spectrophotometric method

HJ/T 51 Water quality determination of total salt content gravimetric method

HJ/T 74 Water quality determination of chlorobenzene gas chromatography method

HJ 84 Water quality determination of inorganic anions (F^- , Cl^- , NO_2^- , Br^- , NO_3^- , PO_4^{3-} , SO_3^{2-} , SO_4^{2-}) ion chromatography method

HJ/T 200 Water quality determination of sulfide gas phase molecular absorption spectrometry method

HJ/T 343 Water quality determination of chloride mercuric nitrate titration method (trial)

HJ 347.2 Water quality determination of fecal coliform group multiple tube fermentation method

HJ/T 399 Water quality determination of chemical oxygen demand rapid digestion spectrophotometry method

HJ 484 Water quality determination of cyanide volumetric and spectrophotometric method

HJ 485 Water quality determination of copper sodium diethyldithiocarbamate spectrophotometry method

HJ 486 Water quality determination of copper 2,9-dimethyl-1,10-phenanthroline spectrophotometry method

HJ 487 Water quality determination of fluoride by visual colorimetry with zirconium sulfonate

HJ 488 Water quality determination of fluoride by spectrophotometry with fluorine reagent

HJ 503 Water quality determination of volatile phenol by spectrophotometry with 4-aminoantipyrine

HJ 505 Water quality determination of five-day biochemical oxygen demand (BOD_5) by dilution and inoculation

HJ 592 Water quality determination of nitrobenzene compounds by gas chromatography
HJ 597 Water quality determination of total mercury by cold atomic absorption spectrophotometry
HJ 621 Water quality determination of chlorobenzene compounds by gas chromatography
HJ 637 Water quality determination of petroleum and animal and vegetable oils by infrared spectrophotometry
HJ 639 Water quality determination of volatile organic compounds by purge and trap/gas chromatography-mass spectrometry
HJ 648 Water quality determination of nitrobenzene compounds Liquid-liquid extraction/solid phase extraction-gas chromatography
HJ 686 Water quality determination of volatile organic compounds purge and trap/gas chromatography
HJ 694 Water quality determination of mercury, arsenic, selenium, bismuth, and antimony atomic fluorescence spectrometry
HJ 700 Water quality determination of 65 elements inductively coupled plasma mass spectrometry
HJ 716 Water quality determination of nitrobenzene compounds gas chromatography-mass spectrometry
HJ 775 Water quality determination of ascaris eggs sedimentation egg collection method
HJ 776 Water quality determination of 32 elements Inductively coupled plasma emission spectrometry
HJ 806 Water quality determination of acrylonitrile and acrolein purge and trap/gas chromatography
HJ 810 Water quality determination of volatile organic compounds headspace/gas chromatography-mass spectrometry
HJ 811 Water quality determination of total selenium 3,3'-diaminobenzidine spectrophotometry
HJ 822 Water quality determination of aniline compounds gas chromatography-mass spectrometry
HJ 823 Water quality determination of cyanide flow injection-spectrophotometry
HJ 824 Water quality determination of sulfide flow injection-methylene blue spectrophotometry
HJ 825 Water quality determination of volatile phenols flow injection-4-aminoantipyrine spectrophotometry
HJ 826 Water quality determination of anionic surfactants flow injection-methylene blue spectrophotometry
HJ 828 Water quality determination of chemical oxygen demand dichromate method
HJ 908 Water quality determination of hexavalent chromium flow injection-diphenylcarbazide spectrophotometry
HJ 970 Water quality determination of petroleum UV spectrophotometry (trial)
HJ 1048 Water quality determination of 17 aniline compounds liquid chromatography-triple quadrupole mass spectrometry
HJ 1067 Water quality determination of benzene series Headspace/gas chromatography
HJ 1147 Water quality determination of pH value electrode method
NY/T 396 Technical specification for monitoring environmental quality of agricultural water sources

3. Terms and Definitions

The following terms and definitions apply to this standard.

3.1 Farmland irrigation water

Water supplied to farmland directly or via channels and pipelines through artificial transportation to meet the needs of crop growth,

3.2 Paddy field crops

Crops suitable for growing in flooded paddy fields, such as rice.

3.3 Dry land crops

Crops suitable for growing in non-flooded environments such as dry land and irrigated land, such as wheat, corn, cotton, etc.

4. Water Quality Requirements for Farmland Irrigation

4.1 Agricultural irrigation water quality control items are divided into basic control items and optional control items.

4.1.1 Basic control items are mandatory items and should comply with the requirements in Table 1.

4.1.2 Selected control items were chosen by the local ecological environment authorities together with authorities of agricultural and rural areas, water conservancy, and others based on the types of farmland irrigation water and dry land crops species. Limits of basic control items should comply with the requirements in Table 2.

Table 1: Limits of Basic Control Items for Farmland Irrigation Water Quality

Serial number	Items	Crop species		
		Paddy field crops	Dry land crops	Vegetables
1	pH value	5.5~8.5		
2	Water temperature/ °C ≤	35		
3	Suspended matter /(mg/L) ≤	80	100	60 ^a , 15 ^b
4	5-day biochemical oxygen demand (BOD ₅) /(mg/L) ≤	60	100	40 ^a , 15 ^b
5	Chemical oxygen demand (COD _{Cr})/(mg/L) ≤	150	200	100 ^a , 60 ^b
6	Anionic surfactant/(mg/L) ≤	5	8	5
7	Chloride (as Cl ⁻) (mg/L) ≤	350		
8	Sulfide (measured in S ²⁻) (mg/L) ≤	1		
9	Total salt content/(mg/L) ≤	1000 (non-saline-alkali soil area), 2000 (saline-alkali soil area)		

10	Total lead/(mg/L) ≤	0.2		
11	Total cadmium/(mg/L) ≤	0.01		
12	Chromium (hexavalent)/(mg/L) ≤	0.1		
13	Total mercury/(mg/L) ≤	0.001		
14	Total arsenic/(mg/L) ≤	0.05	0.1	0.05
15	Fecal coliform count/(MPN/L) ≤	40000	40000	20000 ^a , 10000 ^b
16	Ascaris eggs/(1/10L) ≤	20		20 ^a , 10 ^b
a. Processed, cooked, and peeled vegetables.				
b. Ready to eat vegetables, melons, and herbal fruits				

Table 2: Limits of Selected Control Items for Farmland Irrigation Water Quality

Serial number	Items	Crop species		
		Paddy field crops	Dry land crops	Vegetables
1	Cyanide (as CN ⁻)/(mg/L) ≤	0.5		
2	Fluoride (as F ⁻)/(mg/L) ≤	2 (general area), 3 (high fluoride area)		
3	Petroleum/(mg/L) ≤	5	10	1
4	Volatile phenol/(mg/L) ≤	1		
5	Total copper/(mg/L) ≤	0.5	1	
6	Total Zinc/(mg/L) ≤	2		
7	Total Nickel/(mg/L) ≤	0.2		
8	Selenium/(mg/L) ≤	0.02		
9	Boron/(mg/L) ≤	1 ^a , 2 ^b , 3 ^c		
10	Benzene/(mg/L) ≤	2.5		
11	Toluene/(mg/L) ≤	0.7		
12	Xylene/(mg/L) ≤	0.5		
13	Cumene/(mg/L) ≤	0.25		
14	Aniline/(mg/L) ≤	0.5		
15	Chloroacetaldehyde/(mg/L) ≤	1	0.5	
16	Acrolein/(mg/L) ≤	0.5		
17	Chlorobenzene/(mg/L) ≤	0.3		
18	1,2-Dichlorobenzene/(mg/L) ≤	1.0		
19	1,4- Dichlorobenzene/(mg/L) ≤	0.4		
20	Nitrobenzene/(mg/L) ≤	2.0		
a. Boron-sensitive crops such as cucumbers, beans, potatoes, winter squash, Chinese chives, onions, citrus, etc.				
b. Crops with relevant strong tolerance to boron, such as wheat, corns, green peppers, pakchoi, leeks, etc.				
c. Crops with strong tolerance to boron, such as rice, radish, rapeseed, cabbage, etc.				

4.2 When recycled water from urban sewage treatment plants is used for farmland irrigation, the provisions of GB 20922 shall be implemented.

4.3 Discharge of urban sewage, livestock and poultry breeding wastewater that has not been comprehensively utilized, agricultural product processing wastewater, and rural domestic sewage wastewater, the water quality at nearest intake point downstream should be ensured to meet the requirements of this standard.

5. Monitoring and Analysis Methods

5.1 Monitoring

The monitoring points and sampling methods for the basic and selected control items of farmland irrigation water quality shall comply with the requirements of NY/T 396. The regulations will be followed after the technical specifications for farmland irrigation water quality monitoring are promulgated and implemented.

5.2 Analysis methods

The analysis method of the control items of this standard shall be implemented according to Table 3. After the release and implementation of this standard, any published national monitoring standards if their applicability meets the requirements, shall apply to the testing of the relevant control items in this standard.

Table 3: Analysis Methods for Farmland Irrigation Water Quality Control Projects

Serial Number	Analysis Method	Standard Name	Standard No.
1	pH value	Water quality - pH value measurement electrode method	HJ 1147
2	Water temperature	Water quality - Determination of water temperature using thermometer or inversion thermometer method	GB 13195
3	Suspended solids	Water quality - Determination of suspended solids - Gravimetric method	GB 11901
4	Five-day biochemical oxygen demand (BOD ₅)	Water quality - Determination of five-day biochemical oxygen demand (BOD ₅) dilution and inoculation method	HJ 505
5	Chemical oxygen demand (COD _{Cr})	Water quality - Determination of chemical oxygen demand - Rapid digestion spectrophotometry	HJ/T 399
		Water quality - Determination of chemical oxygen demand - Dichromate method	HJ 828
6	Anionic surfactant	Water quality - Determination of anionic surfactants - Methylene blue spectrophotometry	GB 7494
		Water quality - Determination of anionic surfactants - Flow injection methylene blue spectrophotometry	HJ 826
7	Chloride	Water quality - Determination of chloride silver nitrate titration method	GB 11896

		Water quality - Determination of inorganic anions (F^- , Cl^- , NO_2^- , Br^- , NO_3^- , PO_4^{3-} , SO_3^{2-} , SO_4^{2-}) Ion chromatography	HJ 84
		Water quality - Determination of chloride - Mercury nitrate titration method (trial)	HJ/T 343
8	Sulfide	Water quality - Determination of sulfide - Methylene blue spectrophotometry	GB/T 16489
		Water quality - Determination of sulfide - Gas phase molecular absorption spectrometry	HJ/T 200
		Water quality - Determination of sulfide - Flow injection-methylene blue spectrophotometry	HJ 824
9	Full salt content	Water quality - Determination of total salt content - Gravimetric method	HJ/T 51
10	Total lead	Water quality - Determination of copper, zinc, lead and cadmium -Atomic absorption spectrophotometry	GB 7475
		Water quality Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality Determination of 32 elements by inductively coupled plasma optical emission spectrometry	HJ 776
11	Total cadmium	Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality - Determination of 32 elements by inductively coupled plasma optical emission spectrometry	HJ 776
12	Chromium (hexavalent)	Water quality - Determination of hexavalent chromium - Diphenyl carbazide spectrophotometry	GB 7467
		Water quality - Determination of hexavalent chromium flow injection - Diphenyl carbazide photometric method	HJ 908
13	Total mercury	Water quality - Determination of total mercury - Cold atomic absorption spectrophotometry	HJ 597
		Water quality - Determination of mercury, arsenic, selenium, bismuth and antimony atomic fluorescence method	HJ 694
14	Total arsenic	Water quality - Determination of mercury, arsenic, selenium, bismuth and antimony atomic fluorescence method	HJ 694
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
15	Total Nickel	Water quality - Determination of nickel -	GB 11912

		Flame atomic absorption spectrophotometry	
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality - Determination of 32 elements by inductively coupled plasma optical emission spectrometry	HJ 776
16	Fecal coliform count	Water quality - Determination of fecal coliforms - Multi-tube fermentation method	HJ 347.2
17	Number of roundworm eggs	Water quality - Determination of roundworm eggs - Sedimentation egg collection method	HJ 775
18	Cyanide	Water quality - Determination of cyanide volumetric and spectrophotometric methods	HJ 484
		Water quality - Determination of cyanide flow injection-spectrophotometry	HJ 823
19	Fluoride	Water quality - Determination of fluoride ion selective electrode method	GB 7484
		Water quality - Determination of inorganic anions (F^- , Cl^- , NO_2^- , Br^- , NO_3^- , PO_4^{3-} , SO_3^{2-} , SO_4^{2-}) Ion chromatography	HJ 84
		Water quality - Determination of fluoride - Visual colorimetric method of zirconium alizarin sulfonate	HJ 487
		Water quality - Determination of fluoride - Fluorine reagent spectrophotometry	HJ 488
20	Petroleum	Water quality - Determination of petroleum animal and vegetable oils -Infrared spectrophotometry	HJ 637
		Water quality - Determination of petroleum - UV spectrophotometry (trial)	HJ 970
21	Volatile phenol	Water quality - Determination of volatile phenols 4-aminoantipyrine spectrophotometric method	HJ 503
		Water quality - Determination of volatile phenols - Flow injection-4-aminoantipyrine spectrophotometry	HJ 825
22	Boron	Water quality - Determination of boron - Curcumin spectrophotometry	HJ/T 49
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
23	Total copper	Water quality - Determination of copper, zinc, lead and cadmium atomic absorption spectrophotometry	GB 7475
		Water quality - Determination of copper - Sodium diethyldithiocarbamate	HJ 485

		spectrophotometric method	
		Water quality - Determination of copper 2,9-dimethyl-1,10phenanthroline spectrophotometry	HJ 486
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality - Determination of 32 elements by inductively coupled plasma optical emission spectrometry	HJ 776
24	Total zinc	Water quality - Determination of copper, zinc, lead and cadmium atomic absorption spectrophotometry	GB 7475
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality - Determination of 32 elements by inductively coupled plasma optical emission spectrometry	HJ 776
25	Selenium	Water quality - Determination of selenium - Graphite furnace atomic absorption spectrophotometry	GB/T 15505
		Water quality - Determination of mercury, arsenic, selenium, bismuth and antimony atomic fluorescence method	HJ 694
		Water quality - Determination of 65 elements by inductively coupled plasma mass spectrometry	HJ 700
		Water quality - Determination of total selenium 3,3'-diaminobenzidine spectrophotometry	HJ 811
26	Benzene	Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile organic compounds purge and trap/gas chromatography	HJ 686
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
		Water quality - Determination of benzene series headspace/gas chromatography	HJ 1067
27	Toluene	Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile	HJ 686

		organic compounds purge and trap/gas chromatography	
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
		Water quality - Determination of benzene series headspace/gas chromatography	HJ 1067
28	Xylene	Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile organic compounds purge and trap/gas chromatography	HJ 686
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
		Water quality - Determination of benzene series headspace/Gas chromatography	HJ 1067
29	cumene	Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile organic compounds purge and trap/gas chromatography	HJ 686
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
		Water quality - Determination of benzene series headspace/gas chromatography	HJ 1067
30	aniline	Water quality - Determination of aniline compounds N-(1-naphthyl) ethylenediamine azo spectrophotometry	GB 11889
		Water quality - Determination of aniline compounds gas chromatography - Mass spectrometry	HJ 822
		Water quality - Determination of 17 aniline compounds by liquid chromatography - Triple quadrupole mass spectrometry	HJ 1048
31	Trichloroacetaldehyde	Water quality - Determination of trichloroacetaldehyde - Pyrazolone spectrophotometry	HJ/T 50
32	Acrolein	Water quality - Determination of acrylonitrile and acrolein purge and trap/gas chromatography	HJ 806
33	Chlorobenzene	Water quality - Determination of chlorobenzene - Gas chromatography	HJ/T 74

		Water quality - Determination of chlorobenzenes - Gas chromatography	HJ 621
		Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
34	1,2-Dichlorobenzene	Water quality - Determination of chlorobenzenes - Gas chromatography	HJ 621
		Water quality - Determination of volatile organic compounds purge and trap/gas chromatography - Mass spectrometry	HJ 639
		Water quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
35	1,4-Dichlorobenzene	Water quality - Determination of chlorobenzenes by gas chromatography	HJ 621
		Water quality - Determination of volatile organic compounds gas chromatography - Mass spectrometry	HJ 639
		Water Quality - Determination of volatile organic compounds headspace/gas chromatography - Mass spectrometry	HJ 810
36	Nitrobenzene	Water quality - Determination of nitrobenzene compounds gas chromatography	HJ 592
		Water quality - Determination of nitrobenzene compounds - Liquid-liquid extraction/solid-phase extraction - Gas chromatography	HJ 648
		Water quality Determination of nitrobenzene compounds gas chromatography - Mass spectrometry	HJ 716

6. Implementation and Monitoring

This standard is supervised and implemented by the ecological environment authorities of the governments at all levels together with the relevant authorities such as agriculture and rural areas and water conservancy departments.

END OF TRANSLATION

Attachments:

No Attachments.