

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 757-2015

**Water quality. Determination of chromium. Flame atomic
absorption spectrometry**

水质 铬的测定 火焰原子吸收分光光度法

(English Translation)

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Foreword

To implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on Water Pollution Prevention and Control, to protect the environment, to ensure human health, standardize the determination method of chromium in water, and develop this standard.

This standard specifies flame atomic absorption spectrophotometry for the determination of high concentrations of soluble chromium and total chromium in water and wastewater.

This standard is the first release.

Appendix A and B of this standard are normative appendices, and Appendix C is an informative appendix.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Liaoning Provincial Environmental Monitoring Experimental Center.

This standard is verified by. Jilin Province Environmental Monitoring Center Station, Anshan

Environmental Monitoring Center Station, Dandong City Environmental Monitoring Xinzhai, Fushun Environmental Monitoring Center Station, Jinzhou Environmental Monitoring Center Station and Tieling Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on October 22, 2015.

This standard has been implemented since December 1, 2015.

This standard is explained by the Ministry of Environmental Protection.

1 Determination of chromium in water - Flame atomic absorption spectrophotometric method

Warning. Hydrochloric acid is highly corrosive and highly volatile. Nitric acid and hydrogen peroxide are highly corrosive and strong oxidizing.

Wear protective equipment as required to avoid contact with skin and clothing. Pretreatment of all samples should be carried out in a fume hood.

1 Scope of application this standard specifies the flame atomic absorption spectrophotometry for the determination of chromium in water.

This standard applies to the determination of high concentrations of soluble chromium and total chromium in water and wastewater.

When the sampling volume is the same as the volume of the sample after preparation, the detection limit of chromium in this method is 0.03 mg/L.

The limit is 0.12 mg/L.

2 Normative references

The contents of this standard refer to the following documents or their terms. For undated references, the valid version is appropriate.

Used in this standard.

HJ 678 Water quality metal total digestion microwave digestion method HJ/T 91 Surface Water and Wastewater Monitoring Technical Specifications HJ/T 164 Technical Specifications for Groundwater Environmental Monitoring

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Soluble chromium soluble chromium

Refers to chromium that has not been acidified and filtered through a 0.45 µm filter.

3.2 Total chromium total quantity of chromium

Refers to chromium that has been determined after digestion of the unfiltered sample.

4 Principle of the method

After the sample is filtered or digested, it is sprayed into a rich air-acetylene flame, and the chromium ground state atom formed in the high temperature flame is chrome-free.

The 357.9 nm characteristic line emitted by a cardiac cathode lamp or a continuous light source produces selective absorption, and under certain conditions, its absorbance value it is proportional to the mass concentration of chromium.

5 Interference and elimination

5.1 1 mg/L Fe and Ni, 2 mg/L Co, 5 mg/L Mg, 20 mg/L Al, 100 mg/L Ca to chromium the measurement has negative interference; the addition of ammonium chloride can eliminate the interference of the above metal ions; 20 mg/L of Cu and Zn, 500 mg/L Na and K did not interfere with the determination of chromium, and the addition of ammonium chloride had no effect on the determination of the above metal ions.

5.2

When the existing matrix interference cannot be eliminated by the above method, the standard addition method can be used to eliminate the interference, see Appendix B.

See Appendix A for the inspection of matrix interference and Appendix C for the applicability of the standard addition method.

6 Reagents and materials

Analytically pure reagents that meet national standards are used for analysis, unless otherwise stated. The experimental water is deionized water or equivalent.

Purity of water.

26.1 Hydrochloric acid. $\rho(\text{HCl}) = 1.19 \text{ g/ml}$, excellent grade pure.

6.2

Hydrochloric acid solution. 1 1, prepared with hydrochloric acid (6.1).

6.3

Nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$, excellent grade pure.

6.4

Nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$.

6.5

Nitric acid solution. 19. Prepared with nitric acid (6.4).

6.6

Hydrogen peroxide. $\omega(\text{H}_2\text{O}_2) = 30\%$.

6.7

Ammonium chloride $[\text{NH}_4\text{Cl}]$.

6.8

Ammonium chloride solution. $\rho(\text{NH}_4\text{Cl}) = 100 \text{ g/L}$.

Accurately weigh 10 g of ammonium chloride (6.7), dissolve it in a small amount of water and transfer it to a 100 ml volumetric flask.

Mark the line and shake it.

6.9

Potassium dichromate $[\text{K}_2\text{Cr}_2\text{O}_7]$. Reference reagent.

6.10

chromium standard stock solution. $\rho(\text{Cr}) = 1000 \text{ mg/L}$.

Accurately weigh 0.2829 g of potassium dichromate (6.9) which was pre-dried at $120^\circ\text{C} \pm 2^\circ\text{C}$ for 2 h and constant weight, dissolved in a small amount of water.

Transfer the whole amount to a 100 ml volumetric flask, add 0.5 ml of nitric acid (6.3), dilute to the mark with water, and shake well. Dark room temperature protection Store in a polyethylene bottle or borosilicate glass bottle and keep the pH between 1 and 2 for 1 year. Or purchase a commercially available certified standard substance.

6.11

Chromium standard use solution. $\rho(\text{Cr}) = 50.0 \text{ mg/L}$.

Pipette 5.00 ml of chromium standard stock solution (6.10) into a 100 ml volumetric flask, add 0.1 ml of nitric acid (6.3), dilute with water to the marking line. Can be stored for 1 month.