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HJ

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

HJ 1051-2019

**Soil - Determination of petroleum oil - Infrared
spectrophotometry**

土壤 石油类的测定 红外分光光度法

(English Translation)

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Foreword

In order to implement the "Environmental Protection Law of the People's Republic of China" Environment, protect human health, standardize the determination method of petroleum in soil, and formulate this standard.

This standard specifies infrared spectrophotometry for the determination of petroleum in soil.

This standard is issued for the first time.

This standard is formulated by the Department of Eco-Environmental Monitoring, Laws and Standards Department of the Ministry of Ecology and Environment.

This standard was drafted. Liaoning Anshan Ecological Environment Monitoring Center.

Verification units of this standard. Liaoning Province Ecological Environment Monitoring Center, Liaoning Province Shenyang Ecological Environment Monitoring Center, Changchun City Environmental Monitoring Center Station, Dalian Ecological Environment Monitoring Center in Liaoning Province, Liaoyang Ecological Environment Monitoring Center in Liaoning Province, and Panjin, Liaoning Province Ecological Environment Monitoring Center.

This standard was approved by the Ministry of Ecology and Environment on October 24, 2019.

This standard will be implemented from April 24, 2020.

This standard is explained by the Ministry of Ecology and Environment.

Determination of petroleum in soils-Infrared spectrophotometry Warning. The tetrachloroethylene used in the experiment is harmful to human health. Standard solution preparation, sample preparation, and determination the process should be performed in a fume hood, and protective equipment should be worn during operation to avoid contact with skin and clothing.

1 Scope

This standard specifies infrared spectrophotometry for the determination of petroleum in soil.

This standard applies to the determination of petroleum in soil.

When the sample size is 10 g, the volume of the extraction solution is 50 ml, and the 40 mm quartz cuvette is used, the detection limit of the method is 4 mg/kg, the lower limit of determination is 16 mg/kg.

2 Normative references

This standard refers to the following documents or clauses therein. For undated references, the valid version applies to this standard.

HJ 613 Soil dry matter and moisture determination by gravimetric method HJ/T 166 Technical Specifications for Soil Environmental Monitoring

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Petroleum

It means that under the conditions specified in this standard, it can be extracted by tetrachloroethylene and not adsorbed by magnesium silicate. The wave number is 2930.

-1, 2960 cm⁻¹, 3030 cm⁻¹ Substances with characteristic absorption at all or part of the band.

4 Method principle

The soil was extracted with tetrachloroethylene, and the extract was adsorbed by magnesium silicate. After removing polar materials such as animal and vegetable oils, the petroleum was measured.

The content of petroleum is determined by the wave numbers of 2930 cm^{-1} (the stretching vibration of the CH bond in the CH_2 group) and 2960 cm^{-1} (CH_3 Stretching vibration of the CH bond in the group) and absorbance A3030 at 3030 cm^{-1} (stretching vibration of the CH bond in the aromatic ring), A2960 and A3030 are calculated based on the correction factor.

5 Reagents and materials

Unless otherwise specified, analytical reagents that comply with national standards are used in the analysis. The experimental water is distilled water or equivalent.

Degrees of water.

5.1

Tetrachloroethylene (C_2Cl_4). Using a dry 40 mm empty quartz cuvette as a reference, at a wavenumber of 2930 cm^{-1} , 2960 cm^{-1} and 3030 cm^{-1} should not exceed 0.34, 0.07 and 0, respectively.

5.2

n-hexadecane ($\text{C}_{16}\text{H}_{34}$). chromatographically pure.

5.3

Isooctane (C_8H_{18}). chromatographically pure.

5.4

Benzene (C_6H_6). chromatographically pure.

5.5

Anhydrous sodium sulfate (Na_2SO_4).

It was placed in a muffle furnace at 450 ° C for 4 h, cooled slightly, placed in a ground glass bottle, and stored in a desiccator.

5.6

Magnesium silicate (MgSiO_3). 150 μm to 250 μm (100 mesh to 60 mesh).

Take the magnesium silicate in a porcelain evaporating dish, place it in a muffle furnace at 450 ° C for 4 h, cool it a little, then transfer it to a desiccator to cool to room Warm, store in ground glass bottle. During use, weigh an appropriate amount of magnesium silicate into a ground glass bottle.

Amount, add an appropriate amount of distilled water in accordance with the ratio of 6% (m/m), seal and fully shake, and use after 12 hours.

5.7

Quartz sand. 270 μm to 830 μm (50 mesh to 20 mesh).

Bake in a muffle furnace at 450 °C for 4 h, cool slightly, place in a ground glass bottle, and store in a desiccator.

5.8

Glass fiber filter. 60 mm diameter.

Bake in a muffle furnace at 450 °C for 4 h, cool a bit and store in a desiccator.

5.9

Standard stock solution of n-hexadecane. $\rho \sim 10000 \text{ mg/L}$.

Weigh 1.0 g (accurate to 0.1 mg) of n-hexadecane (5.2) in a 100 ml volumetric flask, dilute with tetrachloroethylene (5.1) Release the volume to the mark and shake well. It can be stored in the refrigerator at 0 °C ~ 4 °C for one year in the dark. Or purchase a commercially available certified reference material.

5.10

Standard solution of n-hexadecane. $\rho = 1000 \text{ mg/L}$.

Dilute the n-hexadecane standard stock solution (5.9) with tetrachloroethylene (5.1) and make up to a 100 ml volumetric flask. Temporary use Match.

5.11

Isooctane standard stock solution. $\rho \sim 10000 \text{ mg/L}$.

Weigh 1.0 g (accurate to 0.1 mg) of isooctane (5.3) into a 100 ml volumetric flask and make up to volume with tetrachloroethylene (5.1).

Shake well. It can be stored in the refrigerator at 0 °C ~ 4 °C for one year in the dark. Or purchase a commercially available certified reference material.

5.12

Isooctane standard solution. $\rho = 1000 \text{ mg/L}$.

Dilute the isooctane standard stock solution (5.11) with tetrachloroethylene (5.1) and make up to a 100 ml volumetric flask. Temporary use Match.

5.13

Benzene standard stock solution. $\rho \sim 10000 \text{ mg/L}$.

Weigh 1.0 g (accurate to 0.1 mg) benzene (5.4) into a 100 ml volumetric flask, make up to