

ICS 13.080
CCS Z 18

HJ

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

HJ 1068-2019

**Soil--Determination of particle size distribution--Pipette method
and hydrometer method
(English Translation)**

Issued on: January 1, 1970

Implemented on: March 24, 2020

Issued by: Ministry of Ecology and Environment

Table of Contents

Foreword

1 Determination of soil particle size Pipette method and hydrometer method

2 Normative references

3 Terms and definitions

4 Method principle

5 Interference and cancellation

6 Reagents and materials

37 Instruments and equipment

Foreword

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

This standard specifies the pipette method and hydrometer method for determining soil particle size.

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. Hebei Ecological Environment Monitoring Center, College of Resources and Environmental Sciences, Hebei Agricultural University.

This standard is verified by. Department of Soil and Water Science, China Agricultural University, Laboratory of the Second Geological Brigade of Hebei Provincial Bureau of Geology and Mining Hebei Huaqing Environmental Technology Co., Ltd., Laboratory of the Fourth Geological Brigade of Hebei Provincial Bureau of Geology and Mineral Resources, Hebei Province Geological Brigade Laboratory, Hebei Geological Experimental Testing Center and Hebei Regional Geological and Mineral Investigation Research Institute Laboratory.

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

This standard will be implemented from March 24, 2020.

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

1 Determination of soil particle size Pipette method and hydrometer method

1 Scope

This standard specifies the pipette method and hydrometer method for determining soil particle size.

This standard applies to the determination of soil particle size.

2 Normative references

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

GB/T 6003.1 Test sieve technical requirements and tests-Part 1. Wire woven mesh test sieve Basic dimensions of GB/T 6005 test sieve, wire mesh, perforated plate and electroformed sheet 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.

Soil particle size distribution Also known as soil particle composition or mechanical composition, it refers to the combination ratio of mineral particles of different particle sizes in the soil.

The percentage of the mass of the kernel is expressed.

Stokes's Law

Under the action of gravity, the falling speed of particles of different diameters is proportional to the square (r^2) of the radius of the sphere (soil) it is inversely proportional to the viscosity coefficient of the dispersion medium.

4 Method principle

A sample of air-dried soil passing through a 2 mm sieve was made into a suspension. Particles larger than 0.063 mm Sub-sieve; particles smaller than 0.063 mm are determined by the pipette method or hydrometer method according to Stokes' law. according to Calculate the percentage content of each level of particle mass, and plot the cumulative distribution of soil particle size on semi-logarithmic paper (see Figure 3).

And determine the soil particle size.

5 Interference and cancellation

5.1

Organic matter and salts (especially insoluble salts such as gypsum) will flocculate and affect the determination of samples.

2 powder to eliminate the effect.

5.2

Iron oxide and carbonate (especially calcium carbonate and magnesium carbonate) will interfere with the dispersion of soil particles and affect the determination.

Sodium sulfite and sodium acetate remove the interference of iron oxide, and the excess of hydrochloric acid solution is used to remove the interference of carbonate.

6 Reagents and materials

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

Or deionized water.

6.1

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

6.2

Hydrochloric acid. $\rho(\text{HCl}) = 1.18 \text{ g/ml}$.

6.3

Glacial acetic acid (CH_3COOH).

6.4

Defoamer. 2-octanol [$\text{CH}_3(\text{CH}_2)_5\text{CH}(\text{OH})\text{CH}_3$], ethanol ($\text{CH}_3\text{CH}_2\text{OH}$).

6.5

Sodium hexametaphosphate [$(\text{NaPO}_3)_6$].

6.6

Anhydrous sodium carbonate (Na_2CO_3).

6.7

Sodium oxalate ($\text{Na}_2\text{C}_2\text{O}_4$).

6.8

Sodium hydroxide (NaOH).

6.9

Calcium chloride (CaCl_2).

6.10

Sodium dithionite ($\text{Na}_2\text{S}_2\text{O}_4$).

6.11

Sodium acetate (CH_3COONa).

6.12

Hydrochloric acid solution. $c(\text{HCl}) = 1 \text{ mol/L}$.

Take 85 ml of hydrochloric acid (6.2) and dilute to 1000 ml with water.

6.13

Hydrochloric acid solution. 1 3.

6.14

Sodium oxalate solution. $c(1/2\text{Na}_2\text{C}_2\text{O}_4) = 0.5 \text{ mol/L}$.

Weigh 33.5 g of sodium oxalate (6.7), add 700 ml of water, heat to dissolve, and dilute to 1000 ml with water after cooling.

6.15

Sodium hydroxide solution. $c(\text{NaOH}) = 0.5 \text{ mol/L}$.

Weigh 20 g of sodium hydroxide (6.8) and dissolve in an appropriate amount of water, and dilute to 1000 ml with water.

6.16

Dispersant solution.

Weigh 33 g of sodium hexametaphosphate (6.5) and 7 g of anhydrous sodium carbonate (6.6), dissolve in an appropriate amount of water, and dilute to 1000 ml with water.

Store in brown bottle, valid for 1 month.

The dispersant solution has a pH of about 9.8 and is suitable for most soils. For soils that still condense after adding the solution, Add different dispersants according to its pH.

neutral soil plus 25.00 ml sodium oxalate solution (6.14), acidic soil plus 25.00 ml Sodium hydroxide solution (6.15).

6.17

Calcium chloride solution. $c(\text{CaCl}_2) = 1 \text{ mol/L}$.

Weigh 111 g of calcium chloride (6.9) in an appropriate amount of water and dilute to 1000 ml with water.