

3.3 pH

3.3.a Glass electrode method

(1) Summary

Measure with a pH meter using a glass electrode

Reference

- 1) **JIS Z 8002:** Methods for determination of pH of aqueous solutions (1984)
- (2) **Reagent:** Reagents are as shown below.
 - a) **Oxalate pH standard solution:** Oxalate pH standard solution class 2 traceable to a specified reference material (national measurement standard) according to Article 134 of the Measurement Act.
 - b) **Phthalate pH standard solution:** Phthalate pH standard solution class 2 traceable to a specified reference material (national measurement standard) according to Article 134 of the Measurement Act.
 - c) **Neutral phosphate pH standard solution:** Neutral phosphate pH standard solution class 2 traceable to a specified reference material (national measurement standard) according to Article 134 of the Measurement Act.
 - d) **Borate pH standard solution:** Borate pH standard solution class 2 traceable to a specified reference material (national measurement standard) according to Article 134 of the Measurement Act.
 - e) **Carbonate pH standard solution:** Carbonate pH standard solution class 2 traceable to a specified reference material (national measurement standard) according to Article 134 of the Measurement Act.

Comment 1 Respective pH standard solutions stored for long time should not be used since the pH value may change during storage period. In particular, note that borate pH standard solution and carbonate pH standard solution easily absorb carbon dioxide in the air, so that the pH values deteriorate. The pH standard solution that was used once or left exposed to the air should not be used.

(3) Instruments: Instruments are shown below.

- a) **pH meter:** Use type II specified in JIS Z 8802.

Comment 2 Conduct the calibration of a pH meter as indicated in JIS Z 8802. Actual calibration operation is according to the operation procedure of the pH meter used for measurement.

When the pH of a sample solution is no more than 7, use neutral phosphate pH standard solution and oxalate pH standard solution, or phthalate pH standard solution. When it exceeds 7, use neutral phosphate pH standard solution and borate pH standard solution, or carbonate pH standard solution.

(4) Test procedures

(4.1) Preparation of sample solution: Conduct preparation of sample solution as shown below.

(4.1.1) Fertilizers except inorganic fertilizers

- a) Transfer a predetermined amount of an analytical sample ⁽¹⁾ into a ground-in stopper flask and add water 5 - 10 times the volume.
- b) Mix with a magnetic stirrer, filter with Type 3 filter paper to make the sample solution.

Note (1) In the case of a moist laboratory sample, it is recommended to use a sample that is not pre-dried.

(4.1.2) Inorganic fertilizers

- a) Transfer a predetermined amount of an analytical sample ⁽¹⁾ into a ground-in stopper flask and add water 100 times the volume.
- b) Mix with a magnetic stirrer, filter with Type 3 filter paper to make the sample solution.

Comment 3 The procedure in (4.1.1) is the same as 3.4.a (4.1). Additionally, the sample solution prepared in 4.2.4.a (4.1) can be used instead of the sample solution prepared by (4.1.2).

(4.2) Measurement: Conduct the measurement as indicated in JIS Z 8802 and as shown below. Actual calibration operation is according to the operation procedure of the pH meter used for measurement.

- a) Wash the read station of a calibrated pH meter repeatedly no less than 3 times with water and wipe out with clean and soft paper, etc.
- b) Transfer a sample solution into a beaker ⁽²⁾, dip the read station in the solution and measure the pH value.

Note (2) It is necessary to transfer sufficient volume of sample solution to keep a measurement value stable.

Comment 4 If a pH meter has a temperature correction dial or a digital switching, measure the pH value after adjusting the graduation of the pH meter with the temperature of a sample.

(5) Flow sheet for pH value: The flow sheet for pH value in fertilizers is shown below.

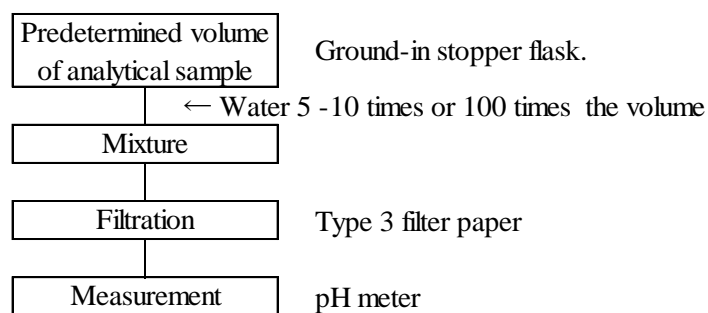


Figure Flow sheet for pH in fertilizers.

3.4 Electrical conductivity

3.4.a Measurement method with an electrical conductivity meter

(1) Summary

Measure the electrical conductivity of organic fertilizers such as compost or sludge fertilizers with an electrical conductivity meter.

Reference

1) JIS K 0130: General rules for electrical conductivity measuring method (2008)

(2) **Reagents:** Reagents are shown below.

- a) **Potassium chloride:** Grind potassium chloride used for measurement of electrical conductivity specified in JIS K 0130 with an agate mortar to powder and heat for 4 hours at $500\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, and then stand to cool in a desiccator.
- b) **Potassium chloride standard solution** ⁽¹⁾: Measure predetermined volume ⁽²⁾ of potassium chloride of a) on a weighing dish, dissolve in a small amount of water, transfer it into a 1,000-mL volumetric flask, and add up to the marked line with water.

Note (1) Store potassium chloride standard solution in a polyethylene or borosilicate glass bottle and seal the bottle.

(2) The volume that is recommended for an instrument or a cell used.

Comment 1 Potassium chloride standard solution used once or left in the air should not be used.

(3) **Instruments:** Instruments are shown below.

- a) **Electrical conductivity meter:** An electrical conductivity meter specified in JIS K 0130

Comment 2 Check the indicated value as shown in 6.2 in JIS K 0130 as necessary. Actual procedure to check is according to the operation procedure of the electrical conductivity meter used for measurement.

(4) Test procedure

(4.1) **Preparation of sample solution:** Conduct the preparation of sample solution as shown below.

- a) Transfer the predetermined volume of an analytical sample ⁽³⁾ into a ground-in stopper flask and add water 10 times the equivalent volume of dry matter ⁽⁴⁾.
- b) Mix with a magnetic stirrer, filter with Type 3 filter paper to make the sample solution.

Note (3) In the case of a moist laboratory sample, it is recommended to use a sample that is not pre-dried.

(4) If the sample solution becomes hard to measure because it is gelled by the influence of flocculants in sludge fertilizer, etc., increase the volume of water added. However this fact should be expressed in the test result.

Comment 3 The procedure in (4.1) is the same as 3.3.a (4.1.1).

(4.2) **Measurement:** Conduct the measurement as indicated in JIS K 0132 and as shown below. Actual measurement operation is according to the operation procedure of the electrical conductivity meter used for measurement.

- a) Wash the read station of an electrical conductivity meter repeatedly no less than 3 times with water.
- b) Transfer a sample solution into a beaker⁽⁵⁾, dip the read station and measure electrical conductivity.

Note (5) It is necessary to transfer sufficient volume of sample solution to keep the measurement value stable.

(5) Flow sheet for electrical conductivity: The flow sheet for electrical conductivity is showed below.

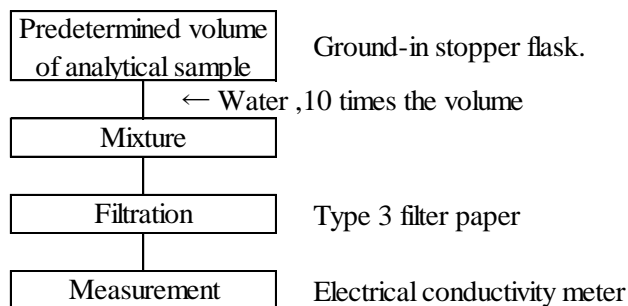


Figure Flow sheet for electrical conductivity in fertilizers.