

◆ K-JCC Copper Test

1. Test equipments

- 1) Atomic absorption photometer : One with automatic background correction facility.
- 2) Beaker : Capacity 100 ml.
- 3) Whole pipette : Capacity 25 ml.
- 4) Wide-mouthed Measuring flasks : Capacity 100 ml each.

2. Test reagents

- 1) Nitric acid : JIS K 8541. Analytically pure, 70%, S.G. 1.42.
- 2) Standard copper solution : JIS K 0010. Reagent for atomic absorption analysis (1,000ppm \doteq 1,000 mg/l).

3. Test piece

Projection area $50 \pm 2 \text{ cm}^2$.

4. Test procedure

1) Operation

Cut the test piece into 8 pieces of about 2.5 cm square each.

Using the whole pipette, Put 25 ml of 70% nitric acid into a 100 ml flask.

Maintain the liquid temperature at $30 \pm 1 \text{ }^\circ\text{C}$.

Extract the possible copper by immersing those 8 test pieces into the nitric acid in the beaker, and sway gently. After one minute, move the extracted liquid into as measuring flask.

Quickly, rinse the test pieces, which are left in the beaker, twice with about 25 ml of pure water. Add this rinse water to the extracted liquid in the measuring flask. Add pure water to make the total volume of the test liquid 100 ml. Perform the quantitative analysis of copper in the above test liquid with the atomic absorption photometers in the automatic background correction mode. Determine the copper density using the calibration curve prepared as per (c) below.

2) Calculation of the amount of copper attached to the foil surface:

$$X = C \times \frac{V}{1,000} \times \frac{10,000}{S} = C \times \frac{100}{1,000} \times \frac{10,000}{50} = C \times 20$$

where,

W: Mass of copper attached to the foil surface per unit projection area (mg/m²).

C: Copper density (mg/l) measured in (a).

V: Total volume of the test liquid, 100 ml, and

S: Projection area of the test piece, 50 cm².

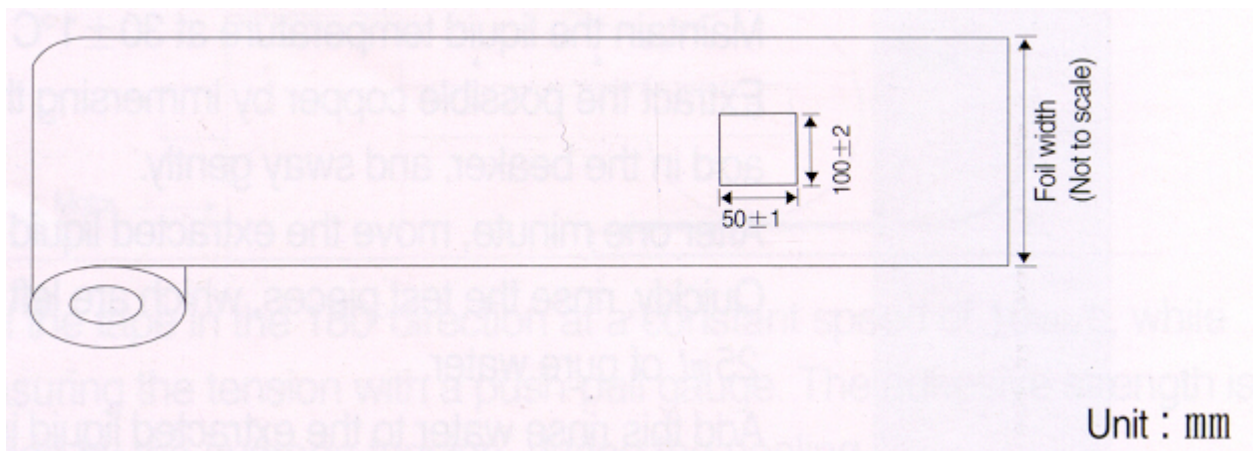
3) Derivation of the calibration curve

Put 5 ml of standard copper solution (1,000ppm \doteq 1,000 mg/l) into a 100 ml measuring flask. Add pure water to make the total volume 100 ml.

Here a standard solution of 50 mg/l is obtained.

Put 0.2, 0.5, 1.0, 1.5, and 2.0 ml of above 50 mg/l standard solution into five 100 ml measuring flask. Add 25 ml of 70% nitric acid and pure water to each flask to make the total volume 100 ml each. Measure the absorption of these standard calibration solutions with the atomic absorption photometer, and make the calibration curve.

5. Sampling



Take one test piece from the center portion of the foil width as shown below.

6. Criteria

Measured mass of the copper per unit projected area (mg/m^2) must be less than the specification value.