

KES

**Analysis Method of
Lead in Copper Products
and Copper Alloys**

KES T – M040

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1. Scope of application

This standard shall specify analysis method of lead in copper products and copper alloys.

2. General particulars

General particulars of analysis method follows refers to KES T-M039

(General rules of analysis method of copper products and copper alloys.)

3. Analysis methods

Lead in copper products and copper alloys are analyzed by following three methods.

(1) Electrolysis method (Apply to samples that Pb contents are less than 6%)

(2) EDTA titration method

(3) Analysis method of light absorption of atom

(Apply to samples that Pb contents are 0.01 ~ 4.50%.)

3.1 Electrolysis method

3.1.1 Summary

Analyze lead quantity from separating amount of oxidized lead by dissolving a sample in nitric acid and oxidizing lead at the anode due to electrolysis.

3.1.2 Reagent

Nitric acid (1 : 1)

3.1.3 Equipment

General rules about electrolysis equipment and the usage refer to a third item in KS M 0013 (Electro-chemical analysis method).

Because platinum pole is used for quantitative analysis of anode separating materials, use screw shape anode that is made by rounding several times sufficiently to have the surface of more than 10cm²

3.1.4 Operation

(1) Cover with a watch-plate and dissolve⁽²⁾ after moving samples measured exactly in a

beaker (250ml) and adding nitric acid (1 : 1)⁽¹⁾

(2) When the samples are melted all, heat up weakly and slowly in order to remove brown nitric oxide and cool it.

Wash the watch-plate and beaker with distilled water and dilute all liquid to 50 ~ 300ml⁽³⁾

(3) After immersing an electrode and putting a lid, do electrolysis for about an hour⁽⁴⁾ with keeping current density as 1.25 ~ 1.50 A/dm².

(4) After wash a lid, wall of jar and electrode well, do electrolysis gain however, keep doing until platinum anode does not become black in spite of electrolysis for 15 minutes by adding water or lowering electrode.

(5) When extraction of lead is finished, keep connecting it to electricity, draw an electrolyte with siphon and add water.

(6) After picking up anode rapidly and washing it in water enough, dry it for 30 minutes at 110 ~ 120 °C.⁽⁵⁾

(7) After cooling anode and revising manganese with oxidized lead, calculate lead content by amount according to following formula.

$$\text{Pb (\%)} = \frac{(A - 1.58 B) \times 86.6}{S}$$

Here, A : Total amount of extracted materials (PbO₂ + MnO₂)

B : Amount of manganese by revision of manganese

C : The amount used

(Note)⁽¹⁾ Amount of sample gained according to lead content by amount in the sample and amount of nitric acid that melt this is as following table 1.