

1. Scope of Test

All Formed Foils for Anode

2. Principle

The chloride ion on foil is extracted in a sodium hydroxide solution. The extract is heated with nitric acid and clarified by centrifugation. A silver nitrate solution is added to the clarified extract to form a suspension of colloidal silver chloride. Residual chloride content of the sample solution is then compared with a standard solution by means of a turbidimetric test.

3. Reagents

1) Sodium Hydroxide Solution

The solution is made by dissolving 2g of sodium hydroxide (as specified in JIS K 8576 – High Grade Reagent) in 1L of deionized water and then stored in a polyethylene bottle.

2) Silver Nitrate Solution

The solution is made by dissolving 2.5g of silver nitrate (as specified in JIS K 8550 – High Grade Reagent) in 500ml of deionized water and then stored in a brown glass bottle.

3) 60% Nitric Acid Solution

The solution is a high grade reagent with a chloride content of 0.5ppm or less as specified in JIS K 8541.

4) Chloride 1ppm Reference Solution

The reference solution is made by dissolving 1.65g of sodium chloride (as specified in JIS K 8150 – High Grade Reagent) in 1L of deionized water; then 1ml of this solution is diluted in deionized water, and the total amount is adjusted to 1L.

4. Test Specimen

Using scissors cut foil from the Projected Area ($125 \pm 5 \text{ cm}^2$) into pieces that are approximately 1 cm^2 .

5. Apparatus

- 1) Centrifuge : 50s^{-1} or higher.
- 2) Warm Water Bath : Capable of maintaining approximately 2L of water at $80 \pm 10^\circ\text{C}$ and $30 \pm 2^\circ\text{C}$.
- 3) Turbidity Meter with Fluorescent Light : A dark box.
- 4) Centrifuge Tube : 50ml
- 5) Temperature Measurement Device : A thermometer as specified in JIS B 7411 with an accuracy of $\pm 1^\circ\text{C}$ at each gradation below 100°C .
- 6) Turbidity Test Tubes : 6 tubes of the same material and shape with measuring increments and a volume of 50ml.
- 7) Conical Flask : 100ml
- 8) Measuring Flask : 100ml
- 9) Measuring Pipette : 5ml
- 10) Cooling Vessel : 3L stainless steel beaker or similar device suitable for cooling.
- 11) Tweezers
- 12) Scissors

6. Test Procedure

6-1.Extraction Using Sodium Hydroxide

- 1) Place test pieces in a 100ml conical flask with tweezers.
- 2) Pour 60ml of the Sodium Hydroxide Solution into the conical flask, stir once or twice and let it stand for approximately 7 minutes at room temperature.

6-2.Clarification of Extract

- 1) Rinse the test pieces two separate times in 10ml of deionized water. Pour this water and the extract obtained from step 6-1. 2) into the 100ml measuring flask and add 3ml of the 60% Nitric Acid Solution.
- 2) Heat the measuring flask with the solution obtained from step 6.2 1) in a warm water bath ($80 \pm 10^\circ\text{C}$) for about 20 minutes.
- 3) Cool solution to room temperature, fill the measuring flask with deionized water to the 100ml marked line and shake extract well before distribution.

6-3.Distribution of Extract

Transfer 30-40ml of extract into a centrifuge tube. After 15 minutes of centrifugation at 50s^{-1} , transfer 20ml of the supernatant liquid to a turbidity test tube. This shall be the Test Solution.

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6-4. Procedure for Turbidity Determination

- 1) Use the measuring pipette to transfer the Chloride 1ppm Reference Solution into four turbidity test tubes. Add deionized water to each tube to adjust total amount to 20ml and make the Reference Solution below.

Reference Solution A	: Chloride 1ppm Reference Solution 1.0ml
Reference Solution B	: Chloride 1ppm Reference Solution 1.5ml
Reference Solution C	: Chloride 1ppm Reference Solution 2.0ml
Reference Solution D	: Chloride 1ppm Reference Solution 2.5ml

- 2) Add approximately 1ml of the 60% Nitric Acid Solution to the Reference Solutions A, B, C and D as well as the Test Solutions developed in 6-3. 1) and 2). Shake well and place the test tubes in a warm water bath ($30 \pm 2^\circ\text{C}$) for 5 minutes.
- 3) Keep the test tubes in the warm water bath and add drops of the Silver Nitrate Solution (approximately 2ml) into each test tube. In a dark room, shake well and let stand for 15 minutes.
- 4) Transfer the test tubes from the warm water bath to the dark box to compare the turbidity of the Reference Solutions with that of the Test Solutions.

7. Residual Chloride Content Measurement

- 1) If the turbidity of Test Solutions is less than or equal to the turbidity of Reference Solution A, the residual chloride ion content of foil is $0.4\text{mg}/\text{m}^2$ or less.
- 2) If the turbidity of Test Solutions is less than or equal to the turbidity of Reference Solution B, the residual chloride ion content of foil is $0.6\text{mg}/\text{m}^2$ or less.
- 3) If the turbidity of Test Solutions is less than or equal to the turbidity of Reference Solution C, the residual chloride ion content of foil is $0.8\text{mg}/\text{m}^2$ or less.
- 4) If the turbidity of Test Solutions is less than or equal to the turbidity of Reference Solution D, the residual chloride ion content of foil is $1.0\text{mg}/\text{m}^2$ or less.

8. Determination

Formed Foil, low voltage	: $\leq 0.8\text{mg}/\text{m}^2$ acceptable
Formed Foil, middle to high voltage	: $\leq 1.0\text{mg}/\text{m}^2$ acceptable
Formed Foil for Photoflash	: $\leq 1.0\text{mg}/\text{m}^2$ acceptable