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**Determination of Corrosion Resistance and Compactness of
Inner Coating or Laminated-film in Metal Containers Used
for Food - Electrochemical Method**

食品金属容器内壁涂覆层耐蚀力和致密性的测定 电化学法

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Determination of Corrosion Resistance and Compactness of Inner Coating or Laminated-film in Metal Containers Used for Food - Electrochemical Method

1 Scope

This document describes the method of determining the corrosion resistance and compactness of the inner coating and laminated film in metal containers used for food.

This document is applicable to the determination of food (cans and beverages, etc.) metal containers based on coated tin-plated or chrome-plated steel sheets (aluminum) and coated iron (aluminum) substrates.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 6682 Water for Analytical Laboratory Use - Specification and Test Methods

QB/T 2763 Coated Tinplate (or ECCS)

3 Terms and Definitions

This document does not have terms or definitions that need to be defined.

4 Principle

By accelerating the electrochemical corrosion of the inner wall of food metal containers, characterize its corrosion resistance. By applying a weak voltage on the inner wall of the metal containers, test the surface double-electron layer capacitance value and the dielectric loss tangent value to characterize its compactness.

5 Reagents and Materials

Unless it is otherwise specified, only analytically pure reagents are used.

7.1.1 At the edge of mouth of the metal container, use a knife to cut the coating film; connect the wire to the exposed iron part and connect the positive electrode of the stable power supply.

7.1.2 At room temperature, pour the test solution (5.2) into the metal container, until the liquid surface is 5 mm ~ 7 mm away from the mouth of the tank; the metal cover shall clamp the sample to the special fixture. Then, pour the test solution (5.2) to immerse the entire test plane. Take the sample piece as the positive electrode, and the stainless-steel electrode with a diameter of 4 mm and a length of 10 mm as the negative electrode; connect a 15 V DC power supply to cause corrosion of the positive electrode. After 1 h, take out the metal container, wash and dry it; observe the size and quantity of corrosion spots.

7.1.3 For some specific products, upon mutual agreement, other corrosive media (for example, canned food contents) can be used, and the test procedures are the same as 7.1.1 and 7.1.2.

7.1.4 The corrosion resistance of the sample shall be rated in accordance with the arithmetic mean of the quantity of corrosion spots of the same size in three metal containers.

7.2 Compactness

7.2.1 At the edge of mouth of the metal container, use a knife to cut the coating film; connect the wire to the exposed iron part, and connect the test electrode of the digital electric bridge.

7.2.2 At room temperature, then, pour the test solution (5.2) into the empty tank, until the liquid level is 3 mm ~ 8 mm from the tank mouth; the metal cover shall clamp the sample to the special fixture. Then, pour the test solution (5.2) and immerse the entire test plane. Maintain continuous immersion at room temperature for 24 h.

7.2.3 After the immersion is completed, use the digital electric bridge, and under the weak voltage of 100 mV and 1,000 Hz, measure the capacitance value and dielectric loss tangent value of the organic film on the inner wall of the metal container or metal cover. Convert the measured capacitance value into the capacitance value per unit area per square centimeter or unit area per 25 square centimeters.

7.2.4 For some specific products, upon mutual agreement, other corrosive media (for example, canned food contents) can be used, and the test procedures are the same as 7.2.1 and 7.2.2.

7.2.5 The capacitance value and dielectric loss tangent value of the sample shall be the arithmetic mean of the measured values of three metal containers.

7.2.6 The absolute difference between two independent determination results obtained under repeatability conditions shall not exceed 10% of the arithmetic mean.

8 Result Expression

The test report shall include the following parts:

- a) Serial No. of this document;

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