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AGRICULTURE INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 65.020

B 17

NY/T 1860.16-2016

Replacing NY/T 1860.16-2010

**Guidance on the determination of physico-chemical
properties of pesticides Part 16: Corrosion
characteristics to packaging material**

农药理化性质测定试验导则

第 16 部分：对包装材料腐蚀性

Issued on: May 23, 2016

Implemented on: October 01, 2016

**Issued by: Ministry of Agriculture and Rural Affairs of the People's
Republic of China**

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Foreword

NY/T 1860 “Guidance on the determination of physico-chemical properties of pesticides” consists of 38 parts:

- Part 1: pH;
- Part 2: Acidity and alkalinity;
- Part 3: Appearance;
- Part 4: Thermal stability;
- Part 5: Ultraviolet/visibility absorption;
- Part 6: Explodability;
- Part 7: Photo-transformation in water;
- Part 8: Partition coefficient (n-octanol/water);
- Part 9: Hydrolysis;
- Part 10: Oxidation/Reduction: chemical incompatibility;
- Part 11: Flash point;
- Part 12: Fire point;
- Part 13: Miscibility with hydrocarbon oil;
- Part 14: Saturated vapour pressure;
- Part 15: Flammability of solids;
- Part 16: Corrosion characteristics to packaging material;
- Part 17: Density;
- Part 18: Specific optical rotation;
- Part 19: Boiling point;
- Part 20: Melting point/melting range;
- Part 21: Viscosity;
- Part 22: Solubility on organic solvents;

Guidance on the determination of physico-chemical properties of pesticides Part 16: Corrosion characteristics to packaging material

1 Scope

This Part specifies the basic requirements for test methods and test report contents for the determination of corrosion characteristics of pesticide products to their packaging materials.

This Part is applicable to the determination of corrosion characteristics of raw pesticides and preparations to the packaging material in pesticide registration tests.

2 Term and definition

For the purpose of this document, the following term and definition apply.

2.1

corrosion characteristics to packaging material

It refers to the property that the electrochemical or chemical reaction of the test object with the packaging material results in destruction or performance degradation of the packaging material.

3 Test methods

Safety tips: The personnel using this Part shall have practical experience in laboratory work. This Part does not indicate all security issues. It is the user's responsibility to take appropriate safety and health measures and to ensure compliance with the relevant national regulations.

3.1 General

3.1.1 Non-aerosol products

The test may be carried out in combination with accelerated storage stability or normal temperature storage stability test.

The packaging container used for test shall be intact and clean commercial packaging container of the test object, or the container of the same material as the commercial packaging container but smaller, with protective layer (e.g. plating layer, paint or fluorinated coating layer), complete without rust, oil traces, dust particles, etc.

The dirt on the packaging container surface may be cleaned with brush, detergent, organic solvent or ultrasonic wave, but it shall avoid damage to the protective layer of the material. Then rinse with water and dry. For metal packaging containers, if not used immediately, place them in the dryer. In special cases (such as aluminum or some copper alloys), store them in the dryer for more than 24 h.

The dried packaging container is weighed (g_1) using an analytical balance. If it is suspected that there is detergent residue or it is not completely dried, then it need be re-cleaned and dried until parallel mass data is obtained.

3.5.1.2 Determination

ADD the test object in the packaging container, and the amount of the test object shall be similar to the actual packaging amount. It is generally 80 % to 90 % of the container space.

The packaging container to which the test object is added is stored at the test temperature. The following storage conditions may be selected: store at $(54 \pm 2) ^\circ\text{C}$ for 2 weeks, store at $(50 \pm 2) ^\circ\text{C}$ for 4 weeks, store at $(45 \pm 2) ^\circ\text{C}$ for 6 weeks, store at $(40 \pm 2) ^\circ\text{C}$ for 8 weeks, store at $(35 \pm 2) ^\circ\text{C}$ for 12 weeks and store at $(30 \pm 2) ^\circ\text{C}$ for 18 weeks. Or combined with the normal temperature storage stability test.

After the test is completed, use the reagents listed in 3.4 to clean the packaging container, but it shall avoid damage to the protective layer of the packaging container. Then rinse with water and dry according to 3.5.1.1.

INSPECT and DESCRIBE the appearance of the cleaned packaging container, OBSERVE whether there is pitting, discoloration, rust, leakage, etc. USE the analytical balance to weigh the cleaned packaging container (g_2).

Blank test: USE a packaging container that has not been exposed to the test object as a blank sample, USE the analytical balance to weigh it (w_1), and then PERFORM the same cleaning and drying process. WEIGH the cleaned blank packaging container (w_2).

3.5.2 Aerosols

3.5.2.1 Preparation of packaging containers

The corrosion characteristic test for aerosols is carried out using normally packaged commercial aerosols.

3.5.2.2 Determination

STORE the sample at $(35 \pm 2) ^\circ\text{C}$ for 3 months. After the storage is completed, USE the penetrator to pierce the bottom of the container, POUR the sample out of the container. CLEAN the empty container to remove corrosion products. RINSE the container with acetone or ethanol to remove residual steam that may cause rust.

CUT each container in the direction of the longitudinal axis, OPEN the container, INSPECT the entire inner surface. OBSERVE whether there is pitting, discoloration, rusting, leakage, etc.

3.6 Data processing

The change rate of corrosion mass of non-aerosol products' packaging material X (%) is calculated according to equation (1).

$$X = \left(\frac{g_1 - g_2}{g_1} - \frac{w_1 - w_2}{w_1} \right) \times 100 \quad \dots\dots\dots (1)$$

where:

g_1 - the mass of the packaging container before the test, in grams (g);

g_2 - the mass of the packaging container after the test, in grams (g);

w_1 - the mass of the blank packaging container before cleaning, in grams (g);

w_2 - the mass of the blank packaging container after cleaning, in grams (g).

3.7 Result determination

3.7.1 Non-aerosol products

INSPECT the appearance of the cleaned packaging container, if no pitting, discoloration, rusting, leakage, etc. is observed, it is determined that the test object is not corrosive to the packaging material.

3.7.2 Aerosol products

If no pitting, discoloration, rusting, leakage, etc. is observed, it is determined that the test object is not corrosive to the packaging material.

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