

**HG**

**CHEMICAL INDUSTRY STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**HG/T 4296-2012**

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**p-Nitrophenol**

对硝基苯酚

**(English Translation)**

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### 1 Scope

This Standard specifies the requirements, safety information, sampling, test methods, inspection rules, as well as marking, labeling, packaging, transportation and storage of p-nitrophenol. This Standard applies to the quality control of p-nitrophenol products.

Structural formula:

Molecular formula:  $C_6H_5NO_3$  Relative molecular mass: 139.11 (according to the international relative atomic mass in

2007) CAS RN: 100-02-7

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition (including all amendments) applies to this document.

GB 190, Packing symbol of dangerous goods

GB/T 191, Packaging - Pictorial marking for handling of goods (mod GB/T 191-2008, ISO 780:1997)

GB/T 601, Chemical reagent - Preparations of reference titration solutions

GB/T 603, Chemical reagent - Preparations of reagent solutions for use in test methods (neq GB/T 603-2002, ISO 6353-1:1982) to release toxic nitrogen oxide gas. This product can cause poisoning by inhalation, ingestion or skin absorption

## 4.2 Material safety data sheet

According to GB/T 16483, the product, when leaving the factory, shall be provided with a detailed material safety data sheet. The material safety data sheet shall include the following contents:

- a) hazard information of the product;
- b) safe use method;
- c) transportation and storage requirements;
- d) protective measures;
- e) emergency treatment measures, etc.

## 5 Sampling

Sampling shall be done in batches, and homogeneous products shall be taken as a batch by the manufacturer. The number of samples per batch shall comply with the provisions of 7.6 in GB/T 6678-2003. The packaging of the samples taken must be in good conditions, and no foreign impurity is allowed to fall into the product during sampling.

When sampling, use a probe to take samples including upper, middle and lower parts.

The total amount of sample taken shall not be less than 500 g. After fully mixing the samples taken, divide them into two clean, dry and well-sealed containers with labels attached to them, indicating: product name, batch number, manufacturer name, sampling date and location. Use one for inspection and the other one for future reference.

### 6.1 General provisions

Unless otherwise specified, use only reagents that are identified as analytical reagents and grade-3 water that is specified in GB/T 6682-2008. The standard titration solutions, preparations and products used in the test shall be prepared and calibrated according to the provisions of GB/T 601 and GB/T 603 unless otherwise specified. The determination of test results shall be carried out according to the comparison method of rounded-off values in 4.3.3 of GB/T 8170-2008.

### 6.2 Evaluation of appearance

Perform visual assessment under natural light.

#### 6.3.1 Reagents and solutions

- a) sodium hydroxide standard titration solution:  $c(\text{NaOH}) = 0.1 \text{ mol/L}$ ;
- b) bromophenol blue indicator solution: Weigh 0.1 g of bromophenol blue and dissolve it in

100 mL of ethanol solution (the volume ratio of ethanol and water is 20:80);

c) thymol blue-phenolphthalein mixed indicator solution: Weigh 0.12 g of thymol blue and 0.34 g of phenolphthalein and dissolve them in 100 mL of ethanol solution (the volume ratio of ethanol and water is 60:40).

### 6.3.2 Determination steps

Weigh 2.0 g (accurate to 0.000 2 g) of p-nitrophenol sample; dissolve it in about 100 mL of hot water (at about 80 °C); cool to room temperature; transfer to a 250 mL volumetric flask; add water to a constant volume.

Accurately pipette 50.00 mL of sample solution into a 250 mL beaker; add 50 mL of water; add 1 mL (about 20 drops) of bromophenol blue indicator solution; use sodium hydroxide standard titration solution to titrate until the solution turns purple as the end point; record the reading V1.

Accurately pipette 50.00 mL of sample solution into a 250 mL beaker; add 50 mL of water; add 4 ~ 5 drops of thymol blue-phenolphthalein mixed indicator solution; use sodium hydroxide standard titration solution to titrate, until the solution turns green and becomes orange as the end point; record the reading V2.

### 6.3.3 Result calculation

The free acid content is calculated by the mass fraction  $w_1$  of hydrochloric acid, and the value is expressed in %, and calculated according to Formula (1):

Where:  $c$  - the exact value of the concentration of sodium hydroxide standard titration solution, in moles per liter (mol/L);

$V_1$  - the numerical value of the volume of sodium hydroxide standard titration solution consumed for titration of free acid, in milliliters (mL);

$M_1$  - the molar mass value of hydrochloric acid, in grams per mole (g/mol), [ $M_1(\text{HCl})$ ]

7 - unknown; 8 - p-nitrophenol.

### 6.5 Determination of ash

Perform the determination according to the provisions of GB/T 21876-2008. The burning temperature is 700 °C  $\pm$  25 °C.

### 7.1 Inspection classification

All the inspection items listed in Table 1 in Chapter 3 of this Standard are type inspection items. Among them, except ash content in Table 1, the rest are exit-factory inspection items, which shall be inspected batch by batch. In the case of normal continuous production, the

type inspection shall be carried out at least once a month. However, the type inspection is required in the following cases:

- a) When the new product is initially finalized;
- b) When the product is produced in a different place;
- c) When there are major changes in the production formula, process and raw materials;
- d) When production is resumed after three months of suspension;
- e) When requested by the customer.

## **7.2 Exit-factory inspection**

p-Nitrophenol shall be delivered only when it passes the inspection by the quality inspection department of the manufacturer, and is attached with a certificate of conformity. The manufacturer shall ensure that all p-nitrophenols shipped meet the requirements of this Standard.

## **7.3 Reinspection**

If one of the indicators in the inspection results does not meet the requirements of this Standard, samples shall be taken from twice the amount of packaging for inspection again. Even if only one indicator fails to meet the requirements of this Standard in the re-inspection results, the entire batch of products shall be judged as unqualified.